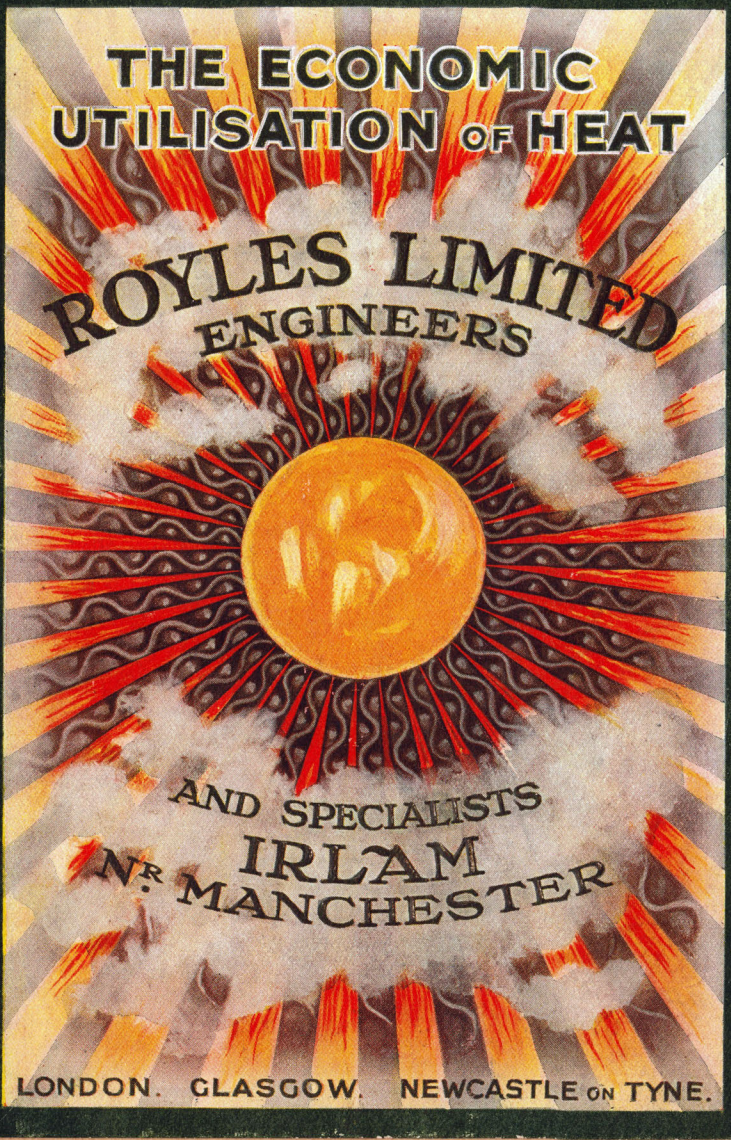
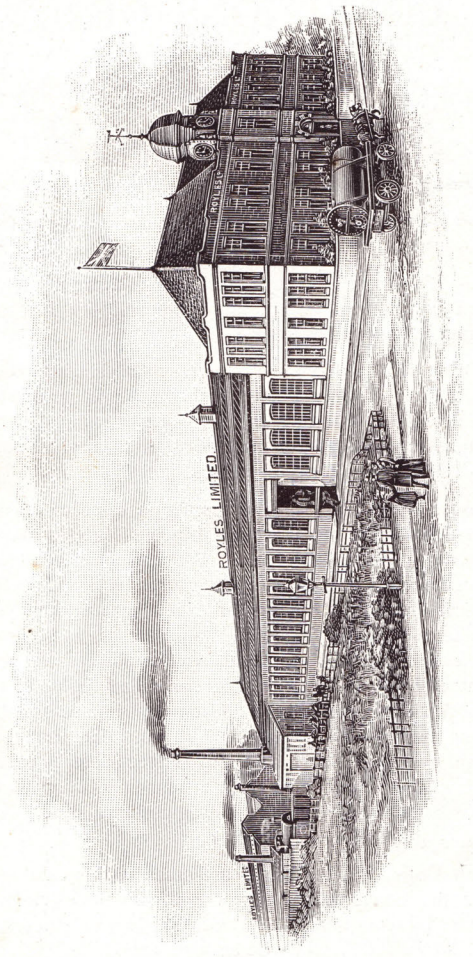
THE ECONOMIC UTILISATION OF HEAT



Printed by
THE FLEET PRINTING CO. (MANCHESTER) LTD.,
CORNBROOK, MANCHESTER.

ROYLES LIMITED, IRLAM, near MANCHESTER.



Works, Erected 1901.

Two minutes' walk from Irlam Station, and twenty minutes' run from Manchester Central Station by Cheshire Lines Railway.

CONDITIONS OF BUSINESS

Cash Terms.—Net-monthly account.

Alteration of Prices.—The prices given in this catalogue are subject to alteration without notice.

Packing.—We excercise every care in the packing of goods, and we cannot accept any responsibility for any damage incurred in transit.

Data.—Great care has been taken to give reliable information throughout this catalogue ; but we cannot guarantee its absolute accuracy in every detail, and all lists, engravings and matter must be taken as approximate, and subject to alteration without notice.

Guarantee.—Everything in our power is done to ensure good material and workmanship in all goods manufactured and sold by us. We cannot accept any responsibility for defects or failures which are the result of improper fixing or excessive working. In cases of failure of goods supplied by us, due to defective material or faulty workmanship, we will put them right free of charge provided the defective goods are returned to our address within a reasonable time from date of delivery. We cannot undertake to send workmen to investigate alleged defects unless we charge their time and expenses in every case. We cannot acknowledge any guarantee other than the conditions above stated.

Telegraph Code.—Code Words are given in this catalogue for the convenience of correspondents desiring to order by telegram. A B C (5th Edition) Engineering, Bentley's and Lieber's Codes also used.

TELEPHONE - - - No. 9 IRLAM.
TELEGRAMS - - - "ELYOR, IRLAM."

Royles Limited

IRLAM,
NEAR
MANCHESTER.

JULY, 1923.

AGENTS AT :

LONDON	Suffolk House, Laurence Pountney Hill, E.C.
GLASGOW	73 Robertson Street.
NEWCASTLE-ON-TYNE	26 Grey Street.
BELFAST	4 Waring Street.

ALSO

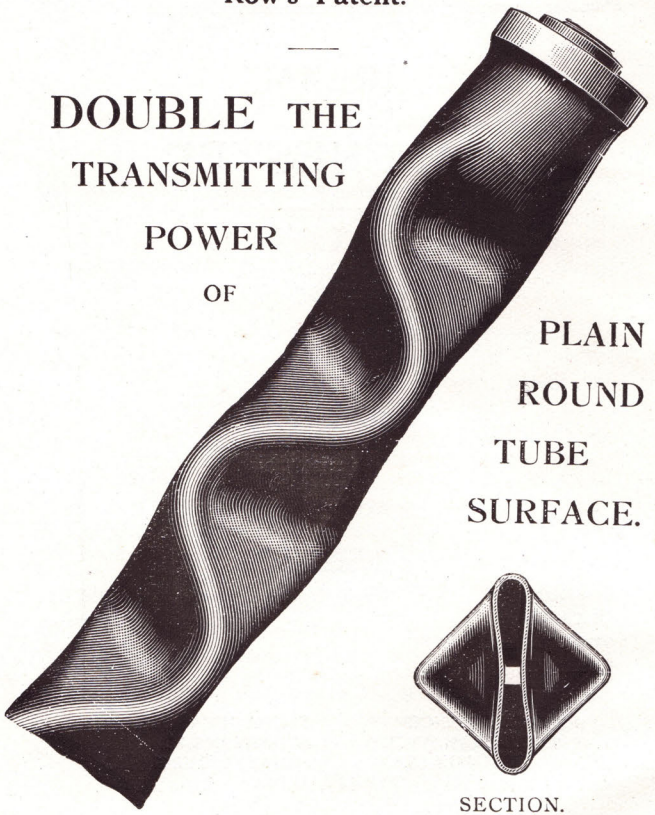
ROUEN (FRANCE) — The HAGUE (HOLLAND)
MELBOURNE (VICT.) — SYDNEY (N.S.W.)
WELLINGTON (N.Z.) — JOHANNESBURG (S.A.)
BOMBAY (INDIA)

SECTION 1.

The ROW Tube.

Row's Patent.

DOUBLE THE TRANSMITTING POWER OF PLAIN ROUND TUBE SURFACE.



SECTION.

The "ROW" Tube

ROW'S PATENT.

The "ROW" Tube here illustrated, the subject of British and various Foreign Patents, is the fundamental feature of the apparatus described in the first portion of the following pages. It is unique in its properties and invaluable in its advantages. We have sought by extensive experiment to excel its efficiency, but have not succeeded.

The Tube is indented as shown, producing a thorough break up of any fluids passing over the surface and experience proves that such indentation increases the efficiency to DOUBLE THAT OF PLAIN TUBE; at the same time the longitudinal rigidity of the Tube is destroyed—the indentation rendering it quite elastic so that it can be fixed between Tube plates without fear of fracture from expansion or contraction, while the cross indents strengthen one another.

The Tubes are formed from solid drawn copper, steel, or other metals of the best quality, and are carefully tested before being made up. For more detailed description see Mr. O. M. Row's Paper on Heat Transmission, read before the Manchester Association of Engineers, sent post free on application.

Calorifiers

ROW'S PATENT.

For heating water by steam for direct or indirect heating systems as applied to public institutions, industrial buildings or cultivating houses.

For supplying hot water for all manufacturing purposes such as bleaching, dyeing, tanning, as well as for use in public baths, wash-houses, etc. Also applied to many of the above uses at sea.

The "Row" Tube Calorifier is made in numerous sizes and patterns to suit all requirements, and has been adopted in many of the largest public institutions and manufacturing concerns as well as the most up-to-date steamship companies.

Note.—Enquiries will be more easily dealt with by customers giving amount of radiating surface or quantity of water to be heated in a given time, also steam pressure available, whether natural or forced circulation and static water pressure on calorifier.

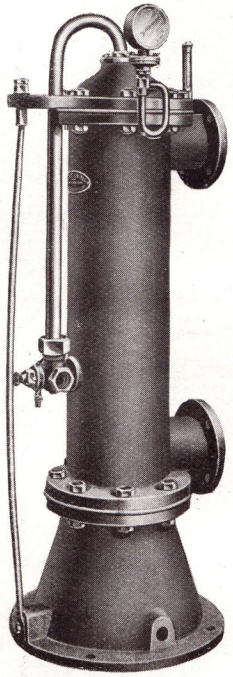


Fig. 1. Standard Pattern.

See Sectional Catalogue.

CALORIFIERS—ROW'S PATENT.

Fig. 1. Standard Pattern, fitted with Royle's Patent Automatic Steam Control Attachment for adjusting the steam cut off at any given temperature.

Fig. 1.—SIZES MADE AND PRICES, LARGER SIZES QUOTED FOR.

No.	Heating Systems. Square feet of radiating surface. Steam 50lbs. sq. in.	Galls. per hour. 50° F.—180° F. Steam 50lbs. sq. in.	PRICE £ s. d.	Extra for Automatic Control Attachment. £ s. d.	Extra for Steam Trap. £ s. d.	Height Over All. Ft. In.	Code Word with Automatic Attachment.
1	... 300 ...	... 100 ...	7 10 0	4 0 0	2 15 0	3 6	Manual
2	... 600 ...	... 200 ...	10 0 0	4 0 0	2 15 0	3 7	Mansion
3	... 900 ...	... 300 ...	14 0 0	4 10 0	2 15 0	3 9	Mantle
4	... 1,200 ...	... 400 ...	17 0 0	4 10 0	3 7 6	3 10	Manner
6	... 1,800 ...	... 600 ...	21 0 0	6 10 0	3 7 6	4 0	Manifest
7	... 2,100 ...	... 700 ...	24 0 0	6 10 0	4 2 6	4 0	Mandril
8	... 3,000 ...	... 1,000 ...	32 0 0	8 0 0	5 5 0	4 11	Mandrain
12	... 4,500 ...	... 1,500 ...	42 0 0	8 0 0	6 10 0	5 1	Manage
16	... 6,000 ...	... 2,000 ...	54 0 0	9 0 0	6 10 0	5 3	Margin
16a	... 9,000 ...	... 3,000 ...	70 0 0	10 0 0	10 0 0	6 9	Mariner
22	... 12,300 ...	... 4,100 ...	90 0 0	12 0 0	10 0 0	7 1	Marksman
28	... 15,600 ...	... 5,200 ...	110 0 0	12 0 0	} Special	7 1	Maroon
34	... 18,900 ...	... 6,300 ...	135 0 0	14 0 0		7 4	Marley
40	... 22,200 ...	... 7,400 ...	155 0 0	14 0 0		7 4	Marmen

Extra for Thermometer £1 5s. 0d. Extra for Pressure Gauge and Syphon £1 10s. 0d.
Extra for Mercury Well 2/6. For which all the Standard Calorifiers are prepared.
Can be arranged horizontally at same price. **See Sectional Catalogue.**

Calorifiers

ROW'S PATENT.

London Pattern.

So called because London water is noted for its hardness.

Special provision is made for cleaning out deposit. Extra surface is also provided to make up for loss of efficiency due to scaling.

Automatically controls the supply of steam to maintain an even desired temperature and prevent waste.

Made in many sizes. When enquiring state the gallons to be heated and steam pressure available, and static head pressure of water.

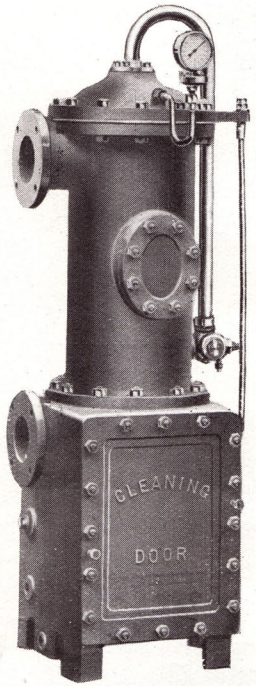


Fig. 2. London Pattern.

Ample inspection and cleaning doors provided.

See Sectional Catalogue.

CALORIFIERS.—ROW'S PATENT.

Fig. 2 "London" Pattern, for Bath Water or other supply. Suitable for Hard Waters.

SIZES MADE AND PRICES.

No.	Duty in Gallons per Hour, heated from 50° to 180° F., with steam at 50lbs. with allowance for scaling up.	PRICE. £ s. d.	Extra for Automatic Control Attachment. £ s. d.	Extra for Steam Trap. £ s. d.	Height Over All. Ft. In.	Code Word with Automatic Attachment.
A	100	16 0 0	4 10 0	2 15 0	4 0	Labore
B	200	20 0 0	4 10 0	2 15 0	4 0	Laconic
C	300	24 0 0	6 10 0	2 15 0	4 4	Lacquer
D	400	28 0 0	6 10 0	3 7 6	4 4	Lactus
E	600	36 0 0	8 0 0	4 2 6	5 2	Lamont
F	800	48 0 0	8 0 0	4 2 6	5 7	Lapis
G	1,200	60 0 0	9 0 0	5 5 0	5 8	Laregan
H	1,800	75 0 0	10 0 0	5 5 0	7 2	Lasdro
I	2,700	93 0 0	12 0 0	6 10 0	7 3	Legal
J	3,600	120 0 0	12 0 0	10 0 0	7 6	Lilac
K	4,800	140 0 0	14 0 0	10 0 0	8 0	Labels

LARGER SIZES MADE TO ORDER.

Extra for Thermometer **£1 5**s. **0**d. Extra for pressure Gauge and Syphon **£1 10**s. **0**d.

Extra for Mercury Well **2/6**. For which all Standard Calorifiers are prepared.

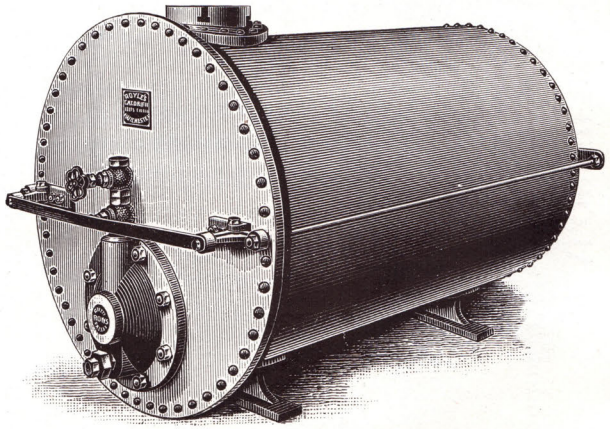
Can be arranged horizontally at same price. **See Sectional Catalogue.**

Storage Calorifier

ROW'S PATENT.

The preceding Calorifiers can be connected to Cylinder for holding a reserve of hot water or this advantage may be attained in our Storage Patterns.

The Calorifier holds, heats, and automatically controls the temperature of a large quantity of water. Made in several sizes in either mild steel or copper. This pattern is specially suitable for hard water as the tubes with cover can be withdrawn from the manhole, the opening giving access for any deposit to be cleared out.



For Land or Marine Service.

See Sectional Catalogue.

Calorifiers.

STORAGE PATTERN.

With Mild Steel Shell and Copper heating surface.

SIZES MADE AND PRICES.

No.	Storage Capacity in Gallons.	Duty in Galls. per Hour, heated from 50° to 180° F., with steam at 50 lbs. and allowance for scaling up.	PRICE. £ s. d.	Extra for Automatic Control Attachment. £ s. d.	Extra for Steam Trap. £ s. d.	Over all dimensions including Automatic Attachment. ft. in. ft. in.	Code Word including Automatic Attachment.
X	50	200	38 0 0	4 10 0	2 15 0	4 0 × 2 8	Sabor
X1	50	400	40 0 0	6 10 0	3 7 6	4 0 × 2 8	Sabret
A	100	500	48 0 0	6 10 0	3 7 6	4 7 × 3 1	Sabido
A1	100	1000	54 0 0	8 0 0	5 5 0	4 10 × 3 1	Sabina
B	150	750	58 0 0	8 0 0	4 2 6	6 0 × 3 3	Sabre
B1	150	1500	62 0 0	9 0 0	6 10 0	6 3 × 3 3	Sacher
C	200	1000	66 0 0	8 0 0	5 5 0	6 3 × 3 9	Sacks
C1	200	2000	72 0 0	9 0 0	6 10 0	6 3 × 3 9	Sacul
D	250	1250	74 0 0	8 0 0	5 5 0	6 4 × 4 0	Safest
D1	250	2500	80 0 0	12 0 0	10 0 0	6 6 × 4 0	Safety
E	300	1500	86 0 0	10 0 0	6 10 0	7 3 × 4 0	Sahal
E1	300	3000	94 0 0	12 0 0	10 0 0	7 6 × 4 0	Sapo
F	400	2500	120 0 0	12 0 0	10 0 0	8 6 × 4 3	Sapien
F1	400	5000	140 0 0	14 0 0	Special.	8 9 × 4 3	Sarab

Storage Pattern.

Made in Copper throughout.

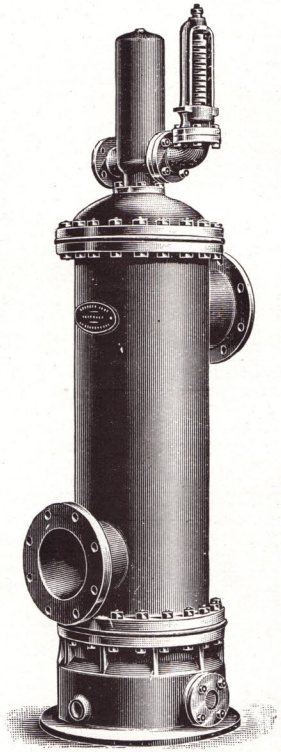
	Storage Capacity in Gallons.	Duty in Galls. per Hour, heated from 50° to 180° F., with steam at 50 lbs. with allowance for scaling up.	PRICE. £ s. d.	Extra for Automatic Control Attachment. £ s. d.	Extra for Steam Trap. £ s. d.	Over all dimensions including Automatic Attachment. ft. in. ft. in.	Code Word with Automatic Attachment.
	10	200	25 0 0	4 0 0	2 15 0	3 0 × 1 6	Saleh
	20	300	28 0 0	4 10 0	2 15 0	3 6 × 2 0	Salem
	30	300	40 0 0	4 10 0	2 15 0	3 6 × 2 2	Saline
	60	500	59 0 0	6 10 0	3 7 6	4 6 × 2 9	Salton
	80	600	66 0 0	6 10 0	3 7 6	4 9 × 2 9	Salvage
Withdrawable battery.	100	750	82 0 0	6 10 0	4 2 6	5 0 × 3 0	Saloon
	125	1000	96 0 0	8 0 0	5 5 0	6 0 × 3 0	Samoth
	150	1200	104 0 0	8 0 0	5 5 0	6 0 × 3 3	Samter
	200	1400	126 0 0	8 0 0	6 10 0	6 0 × 3 9	Sanitor
	250	2500	140 0 0	12 0 0	10 0 0	7 3 × 3 9	Sansof

Prices of the Copper Calorifiers are liable to serious fluctuation due to the Metal Market.
We are always glad to quote to special requirements.

Feed Water Heaters

ROW'S PATENT.

EXHAUST STEAM TYPE.



Class "A"

FOR

Land Purposes.

For utilizing **EXHAUST** Steam and imparting a high temperature to Boiler Feed and **SAVING** from

15% to 20%

OF FUEL.

Saves the Boiler from strains and eases the firing.

Made in any size from

10 I.H.P. UPWARDS.

When enquiring please state weight of feed water to be heated and initial temperature, quantity of exhaust steam available and the quality of the

FEED WATER

as regards hardness or other impurities.

A Subject Worthy of Close Consideration.

Bye-pass arrangement for feed or Exhaust and Air Vessel and Relief Valve can be provided.

See Sectional Catalogue.

FEED WATER HEATERS—ROW'S PATENT.

Class "A" Pattern.

EXHAUST STEAM TYPE.

SIZES MADE AND PRICES.

No.	Lbs. of Water per hour Heated from 50° to 180° F	Approx. I.H.P. at 30 lbs. of Feed per I.H.P. per hour	Bore of Exhaust Pipe	Bore of Feed Pipe	Total Height and Greatest Diameter (WITHOUT AIR VESSEL, AND RELIEF VALVE).	Approximate Weight	PRICE	Extra for Air Vessel	Extra for Relief Valve	Code Word
			Ins.	Ins.	Ft. In. Ft. In.	ton. Cwt. Qr.	£ s. d.	£ s. d.	£ s. d.	
3	900	30	3	1	3 7×0 14	0 1 3	**14 0 0**	**1 10 0**	**2 0 0**	Income
4	1,200	40	3	1	3 7×0 15	0 2 2	**17 0 0**	**1 10 0**	**2 0 0**	Include
6	1,800	60	4	1¼	3 9×0 17	0 3 2	**21 0 0**	**1 17 6**	**2 15 0**	Incite
7	2,100	70	4	1¼	3 9×0 17	0 3 3	**24 0 0**	**1 17 6**	**2 15 0**	Incase
8	3,000	100	4½	1¼	4 6×0 19	0 4 3	**32 0 0**	**1 17 6**	**2 15 0**	Inbred
12	4,500	150	5	1½	4 6×0 21	0 6 1	**42 0 0**	**2 12 6**	**3 10 0**	Incline
16	6,000	200	6	1½	4 6×0 23	0 8 2	**54 0 0**	**2 12 6**	**3 10 0**	Impulse
16a	9,000	300	7	2	6 0×2 0	0 10 2	**70 0 0**	**3 0 0**	**3 10 0**	Improve
22	12,000	400	9	2	6 3×2 4	0 16 3	**90 0 0**	**3 0 0**	**3 10 0**	Impress
28	15,000	500	10	2½	6 4×2 8	1 1 2	**110 0 0**	**3 15 0**	**4 10 0**	Impact
34	17,000	566	12	3	6 7×3 0	1 5 0	**135 0 0**	**4 10 0**	**5 10 0**	Imlad
40	20,000	666	12	3	6 7×3 0	1 6 0	**155 0 0**	**4 10 0**	**5 10 0**	Imberge

N.B.—The Code Word is understood to cover the Heater only.
For Hard or Impure Waters see Class 'B' Heaters.

Larger sizes on application.

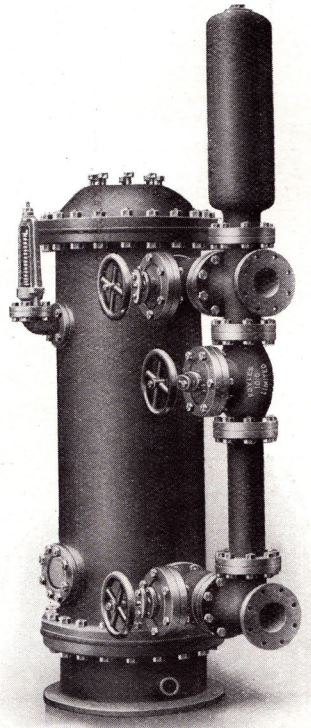
See Sectional Catalogue.

Feed Water Heaters

Row's Patent.

EXHAUST STEAM TYPE.

Class "B" for Hard or Impure Water.



See Sectional Catalogue.

FEED WATER HEATERS.—ROW'S PATENT. CLASS "B."

FOR HARD WATERS. **EXHAUST STEAM TYPE.**

SIZES MADE AND PRICES.

No.	Lbs. of Water per hour Heated from 50° to 180° F	Approx I.H.P. at 30 lbs. of Feed per I.H.P. per hour	Bore of Exhaust Pipe	Bore of Feed Pipe	Total Height and Greatest Diameter (WITHOUT AIR VESSEL, RELIEF VALVE AND BYE-PASS)	Approximate Weight	PRICE	Extra for Exhaust Bye-pass consisting of Bend, Tee and Valve	Extra for Feed Bye-pass consisting of 3 Stop Valves & Connections	Extra for Air Vessel	Extra for Relief Valve
			Ins.	Ins.	Ft. In. Ft. In.	Ton. Ct. Qr.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
3	900	30	1¼	1	3 1×0 14	0 3 1	16 0 0	3 0 0	5 10 0	1 10 0	2 0 0
4	1,200	40	1½	1	3 8×0 14	0 3 2	19 0 0	4 10 0	5 10 0	1 10 0	2 0 0
6	1,800	60	1½	1¼	4 0×0 21	0 5 3	23 0 0	4 10 0	8 10 0	1 17 6	2 15 0
7	2,100	70	2	1¼	4 0×0 21	0 6 1	27 0 0	6 0 0	8 10 0	1 17 6	2 15 0
8	3,000	100	2	1¼	4 8×0 21	0 8 0	37 0 0	6 0 0	8 10 0	1 17 6	2 15 0
12	4,500	150	2½	1½	4 10×2 1	0 14 2	48 0 0	7 10 0	11 10 0	2 12 6	3 10 0
16	6,000	200	3	1½	4 11×2 4	0 16 0	62 0 0	9 0 0	11 10 0	2 12 6	3 10 0
16a	9,000	300	3½	2	6 5×2 4	0 17 0	76 0 5	10 10 0	21 10 0	3 0 0	3 10 0
22	12,000	400	4	2	6 7×2 8	1 3 2	98 0 0	12 10 0	21 10 0	3 0 0	3 10 0
28	15,000	500	4	2½	6 11×3 8	1 4 0	120 0 0	12 10 0	25 10 0	3 15 0	4 10 0
34	17,000	566	5	3	7 3×4 0	1 5 0	150 0 0	14 10 0	30 10 0	4 10 0	5 10 0
40	20,000	666	5	3	7 3×4 0	1 6 0	175 0 0	14 10 0	30 10 0	4 10 0	5 10 0

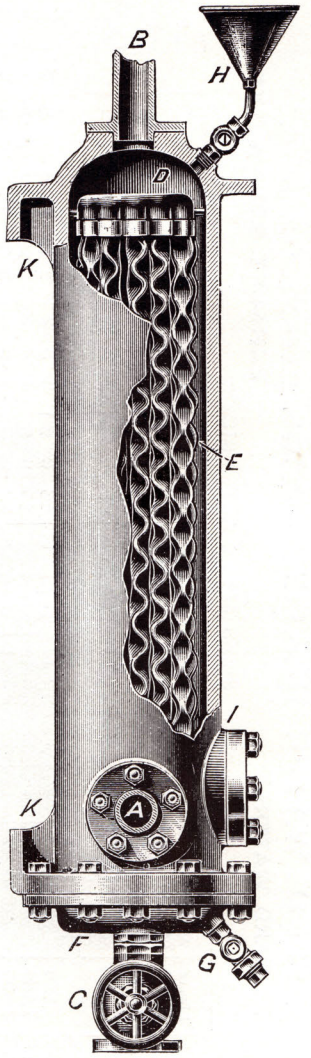
CODE WORDS, same as Class "A" with the addition of letter "B." Example: "BINDENT."

See Sectional Catalogue.

Feed Water Heaters

ROW'S PATENT.

Live Steam Pattern.



This Heater has been extensively adopted in the Marine **and might with advantage be more generally adopted in land practice.**

There is undoubtedly an economy of fuel in heating feed water by live steam and the practice saves the Boiler from destructive strains.

When used in connection with economizers on land plant saves the wasting of the economizer tubes.

SUITABLE FOR THE HIGHEST PRESSURES.

MADE TO PASS BOARD OF TRADE and LLOYDS.

Supplied in Standard sizes from 250 to 3000 I.H.P. and upwards.

See Sectional Catalogue.

Feed Water Heaters

ROW'S PATENT.

LIVE STEAM PATTERN.

Standard Sizes made.

No.	Approx. I.H.P. at 20lbs. Feed per I.H.P. per hour.	Size of Feed	Price of Heater	Extra for Feed Bye-pass	Extra for Air Vessel	Extra for Relief Valve	Code Word
		ins.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
1	250	1½					Impinge
2	500	2					Import
3	750	2					Imply
4	1,000	2½					Implement
5	1,250	2½	**Prices**	**on**	**appli**	**cation**	Imperial
6	1,500	3					Imbue
7	2,000	3					Implic
8	2,500	4					Impugn
9	3,000	4					Imagine

The Mountings included in above price consist of Steam Inlet Valve, Drain Outlet Cock, Blow-down Cock, Air Cock and Soda Funnel.

See Sectional Catalogue.

Evaporators

ROW'S PATENT.

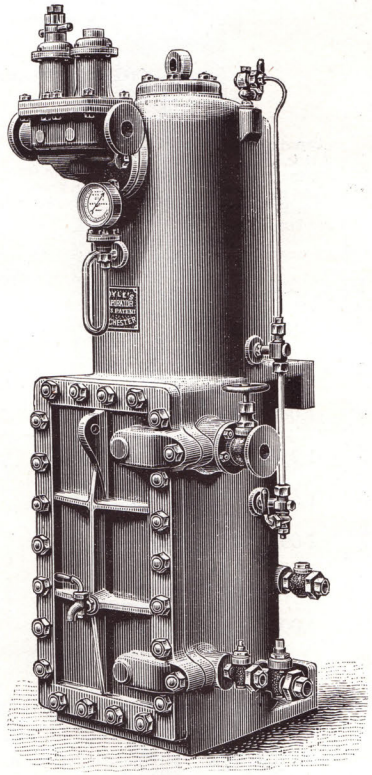
For Sea or Land Use.

For producing pure water from sea or other impure water, the pure vapour from the Evaporator being distilled in a suitable condenser. Extensively used at sea on passenger, troop, or cattle ships, and in countries where pure water is scarce.

Made to the Board of Trade and Lloyds requirements.

The most compact and accessible Evaporator on the market, and most easily cleaned, the form of tube casting its own scale.

Guaranteed efficiency.



CLOSED FOR USE.

See Sectional Catalogue.

Evaporators

ROW'S PATENT.

Standard Sizes made.

No.	Tons of Water evaporated per day of 24 hours.	PRICE	Code Words.
		£ s. d.	
1	2½		Eagle
2	5		Earl
3	7½		Earmar
4	10	**PRICES**	Earnest
5	12½	**ON**	Earshot
6	15	**APPLICATION.**	Earth
7	20		Ease
8	25		Ebach
9	30		Ebion

See Sectional Catalogue.

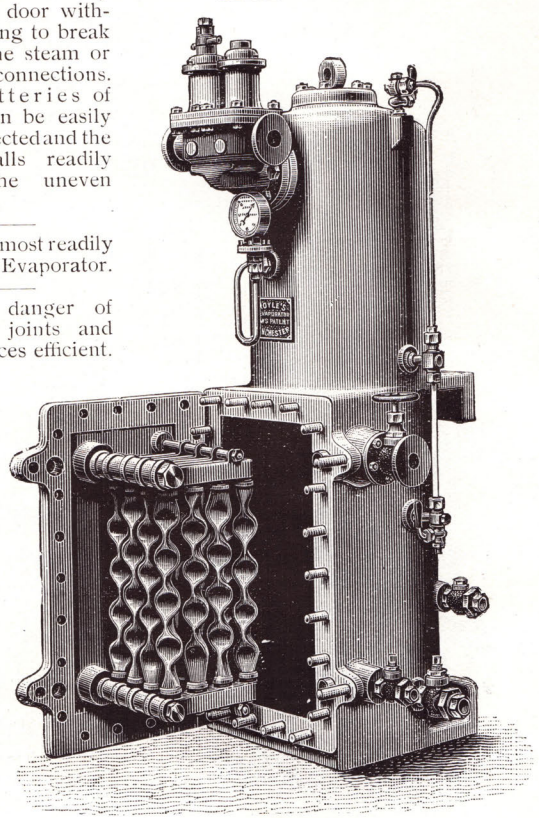
Evaporators

ROW'S PATENT.

The Heating Tubes come away with the door without having to break any of the steam or water connections. The batteries of tubes can be easily disconnected and the scale falls readily from the uneven surfaces.

The most readily cleaned Evaporator.

No danger of leaking joints and all surfaces efficient.



OPEN FOR CLEANING.

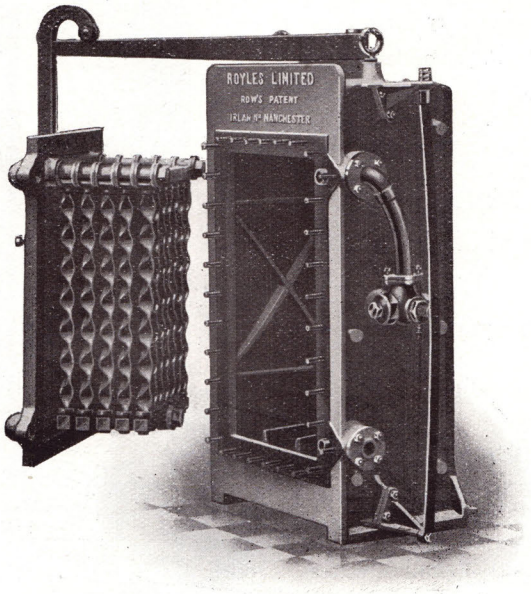
See Sectional Catalogue.

Evaporator Pattern Calorifier

ROW'S PATENT.

THE SPECIAL TYPE OF BATTERY illustrated on the preceding page may be used in many steam appliances, where a sectional battery is an advantage. Only one spare section need be carried and this can be shipped into place in the shortest possible time.

The illustration below shows this form applied to a Calorifier, and is of the type fitted to the **KING'S YACHT.**



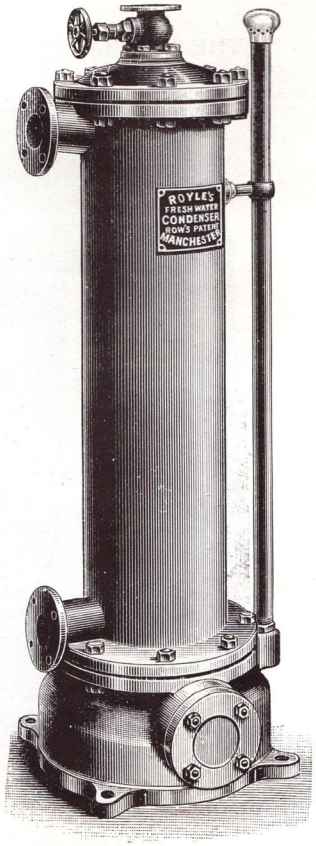
Prices quoted on application.

See Sectional Catalogue.

Fresh Water Condensers

ROW'S PATENT.

For distilling pure drinking water from sea or other impure sources, taking steam from main, or donkey boiler, or from Evaporator, for passenger, troop, or cattle ships, or land purposes.



Made to full Board of Trade and Lloyds requirements.

Efficient, Strong, Accessible,

and guaranteed to yield the full amount of water specified.

See Sectional Catalogue.

CONDENSERS

ROW'S PATENT.

Made in two Patterns, B.T. to pass Board of Trade. C.P. a lighter pattern to meet ordinary requirements.

No.	Duty in Galls. per 24 hours. A	Duty in Galls. per 24 hours B	Pattern B.T. to pass Board of Trade.	Pattern C.P. without Filter.	Pattern C.P. with Filter.
			£ s. d.	£ s. d.	£ s. d.
1	500	350			
2	1,000	500			
3	1,500	1,000			
4	2,000	1,200		**PRICES**	
5	2,500	1,500		**ON**	
6	3,000	2,000		**APPLICATION**	
7	4,000	2,500			
8	5,000	3,000			
9	6,000	4,000			

A.—When condensing High Pressure Steam.
B.—When condensing Low Pressure Evaporator Steam

See Sectional Catalogue.

Instantaneous Heater

ROW'S PATENT.

Introduced to meet the demand for a compact quick heater, to be fixed over a Bath or Lavatory Basin. Heats the water as it runs through. Constructed entirely of Gun Metal and Copper. No pressure on the water side, and suitable for the highest steam pressures.

Fitted with Steam Inlet Valve and one water valve, which may be placed either right or left hand. An additional valve may be fitted allowing the use of either fresh or salt water.

Very successfully used in Marine Practice.

A cheaper pattern of exactly similar design is made with cast iron body, the inside being stove enamelled white.

See Sectional Catalogue.

Instantaneous Heater

ROW'S PATENT.

This Heater has been extensively adopted for Ships' Baths.

SIZES MADE AND PRICES.

Size	Water heated to 100°F. per minute, Steam at 50lbs.	PRICES. G.M.			C.I. Body White Enamelled			Code Word
	Gallons	£	s.	d	£	s.	d.	
1	2	4	10	0	3	0	0	Kalendar
2	6	7	10	0	5	0	0	Kolo
3	12	10	10	0	7	0	0	Kalan

The Code word is for the Standard G.M. Heater.
Interior of C. I. Body Pattern is of Copper and Gun Metal.
If C.I. is required please add "IRON."

Particulars of other patterns upon application.

See Sectional Catalogue.

Steam Kettles

ROW'S PATENT.

For use wherever a copious supply of Boiling Water is desired, derived from steam.

These Kettles are made of copper and all surfaces in contact with water heavily tinned.

Fig. 1. is similar to the illustration with the exception of the battery, which is smaller and placed horizontally for use with high pressure steam.

Fig. 3 (as illustrated) is fitted with an increased amount of **"ROW" Tube** surface for low pressure steam.

An Automatic Steam Control can be fitted if desired to keep the water JUST boiling with the minimum steam consumption. This effects a great saving where the demand for boiling water is intermittent.

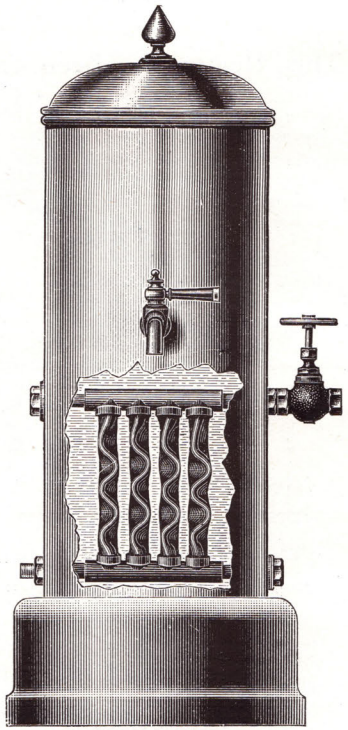


Fig. 3.

See Sectional Catalogue.

STEAM KETTLES

SIZES MADE AND PRICES.

Fig. 1.

No. of Kettle	Capacity	Time required to boil up	Steam Pressure	PRICE	Code Word	Extra for Steam Trap
	Gallons	Minutes	Lbs.	£ s. d.		£ s. d.
00	3	10	60	**6 0 0**	Kamp	**2 0 0**
0	5	10	60	**7 0 0**	Kale	**2 0 0**
1	10	10	60	**8 10 0**	Kitchen	**2 0 0**
2	15	10	60	**11 10 0**	Keep	**2 15 0**
3	20	10	60	**14 0 0**	Kindle	**2 15 0**
4	30	10	60	**18 0 0**	Keen	**2 15 0**
5	40	15	60	**26 0 0**	Kidnap	**3 7 6**
6	50	15	60	**32 0 0**	Knapsack	**3 7 6**
7	70	20	60	**45 0 0**	Kimbo	**4 2 6**
8	100	20	60	**60 0 0**	Kind	**4 2 6**

Fig. 3. Low Pressure Pattern.

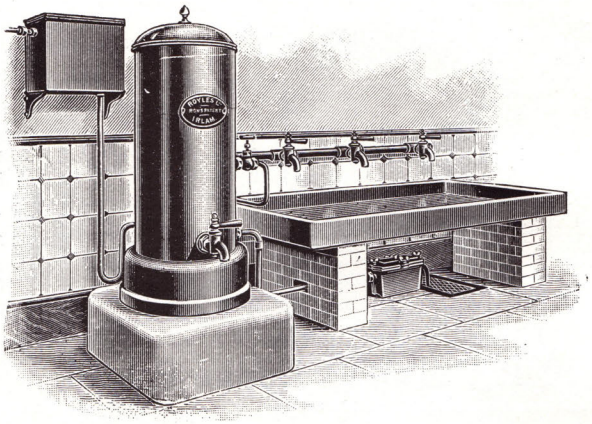
No	Capacity	Time required to boil up	Steam Pressure	PRICE	Code Word	Extra for Steam Trap
	Gallons	Minutes	Lbs.	£ s. d.		£ s. d.
1	10	10	30	**10 0 0**	Kidney	**2 0 0**
2	15	10	30	**13 0 0**	King	**2 15 0**
3	20	10	30	**16 0 0**	Kingdom	**2 15 0**
4	30	10	30	**20 0 0**	Kingfisher	**2 15 0**
5	40	10	30	**29 0 0**	Kingsfolk	**3 7 6**
6	50	10	30	**35 0 0**	Knitter	**3 7 6**

See Sectional Catalogue.

Steam Kettles

ROW'S PATENT.

Fig. 4.



This is a perspective view of a Kettle fixed in the most convenient and thorough manner, and well suited for use in a large works where a number of hands may be drawing at one and the same time. The Kettle is **automatic** in the **water supply**, being fed by ball tap cistern as shown. It will give a continuous supply of **absolutely boiling water** at the draw-off taps at the rate given in the price list, and will keep up the supply as long as may be desired without any wasteful boiling away. Securing the draw-off taps to a wall or partition, as shown, prevents undue wrench on the Kettle sides.

See Sectional Catalogue.

STEAM KETTLES

ROW'S PATENT.

Fig. 4.

Sizes made and Prices.

Complete, ready for fixing as shown, including copper water cistern, ball tap, copper down pipe, delivery pipe, and draw off taps, but exclusive of the automatic steam control and steam trap which are given as extras. The Kettle can be supplied with or without the automatic steam control device.

No.	Capacity	Time required to boil up	Steam Pressure	PRICE	Code Word	Extra for Automatic Steam control	Extra for Steam Trap
	Gallons	Minutes	Lbs.	£ s. d.		£ s. d.	£ s. d.
1	10	10	60	**16 0 0**	Kanal		**2 0 0**
2	15	10	60	**19 0 0**	Kast	**3 15 0**	
3	20	10	60	**22 0 0**	Karant		**2 15 0**
4	30	10	60	**28 0 0**	Koran		
5	40	15	60	**37 0 0**	Kirk	**5 5 0**	**3 7 6**
6	50	15	60	**42 0 0**	Kitten		

Absolutely Boiling Water.
Automatic in Water Supply.
No wasteful boiling away.

See Sectional Catalogue for other patterns for special requirements.

GAS KETTLES

ROW'S PATENT.

For heating and boiling water by Gas. This Kettle is very quick in action, and most economical in the use of Gas, and is much stronger than the ordinary Kettles of this class.

MADE IN COPPER TINNED THROUGHOUT.

Made in several sizes from 4 gallons upwards.

See Sectional Catalogue.

Gas Kettles

Row's Patent.

Sizes made and Prices.

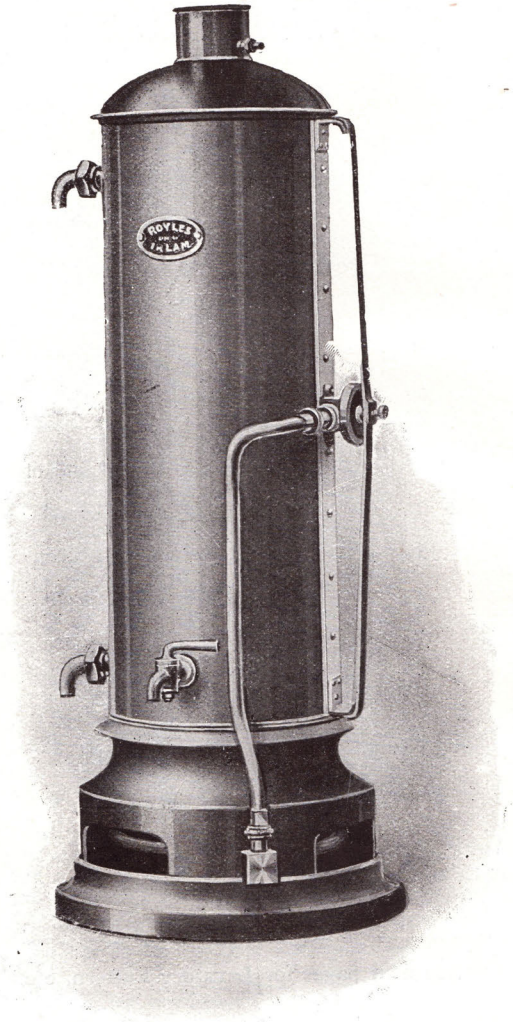
No.	Capacity	PRICE	Code Word
	Gallons	£ s. d.	
1	4	**12 10 0**	Laudable
2	6	**14 0 0**	Laurel
3	8	**18 10 0**	Launch
4	10	**21 0 0**	Latent

Larger sizes quoted for on application.

Extra for Copper Automatic Supply Cistern, Copper Connecting Pipe, and Ball Tap, **£3 15 0**

See next pages for Lavatory Pattern, etc.

GAS KETTLES.—ROW'S PATENT.



GAS KETTLES

ROW'S PATENT.

With Royle's Patent Automatic Gas Control for Public and Private Lavatories, etc.

This Kettle is designed to supply hot water for Lavatories with regularity and certainty, and without any attention.

It is made throughout of copper, tinned on all the working surfaces. The heating medium is gas burned in a series of flat burners, the products of combustion passing up a number of Row's Patent Tubes, which transmit the heat to the water in the containing vessel. The Kettle works by displacement, cold water entering at the bottom from an overhead supply cistern, displacing the hot as drawn off at the lavatory taps.

The gas supply is regulated by the tension bar device. Such a bar is very sensitive to change of temperature in the Kettle, the movement on the middle being received upon a gas valve. As hot water is drawn off and cold enters by displacement, the tension bar responds to the change of temperature and opens the gas valve, so turning on the gas till the water is raised again to the proper temperature (generally about 150 degs. to 160 degs. F.), when the gas flames are lowered to a point just sufficient to hold the water at the pre-determined temperature ready for the next draw-off. The No. 1 Size holds about 10 gallons, and is equal to the supply of 30 gallons of water per hour at 110 degs. F., sufficient for the supply of six lavatory basins each used every 10 minutes.

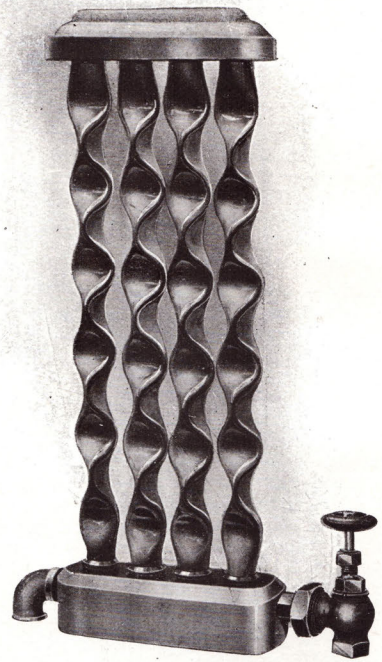
Sizes made and Prices.

No.	Capacity	Water Heated per Hour to 110°F.	Size of Gas Connection.	Size of Flow Return and Cold Water Pipes	PRICE	Code Word
	Galls.	Galls.	Ins.	Ins.	£ s. d.	
1	10	30	½	1	**Prices on**	Landing
2	20	60	¾	1¼	**Appli-**	Lance
3	30	90	1	1¼	**cation.**	Lamp

Extra for Copper Cold Water Supply Tank, Ball Valve, and Copper Connecting Pipe, **£3 15 0**

See Sectional Catalogue.

Radiators—Row's Patent.



A first-class article for high pressure steam heating. Made with Gun-Metal Boxes and Copper tubes, also Cast Iron Boxes and Steel tubes. Largely used in Steam Yachts and Liners.

Polished Bright or Nickel-plated.
Made in Several Sizes or to Order.

When enquiring for prices state size of room to be heated and the steam pressure available.

See Sectional Catalogue.

Radiators

Row's Patent.

Sizes made and Prices.

STANDARD HEIGHT OF RADIATOR **3** ft.

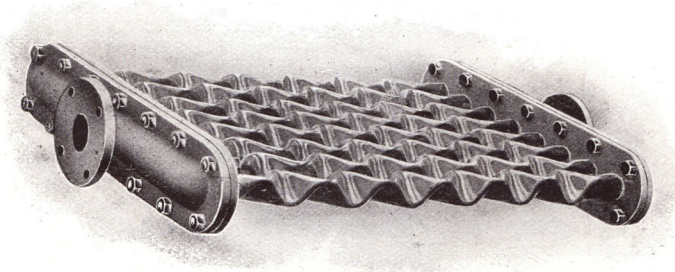
Size	PRICE Brass and Copper	PRICE Brass and Copper heavily Nickel plated	PRICE Iron and Steel
Tubes	£ s. d.	£ s. d.	£ s. d.
3	7 10 0	9 0 0	3 15 0
6	15 0 0	18 0 0	7 10 0
9	22 10 0	27 0 0	11 5 0
12	30 0 0	36 0 0	15 0 0

VALVES AND ELBOWS EXTRA.

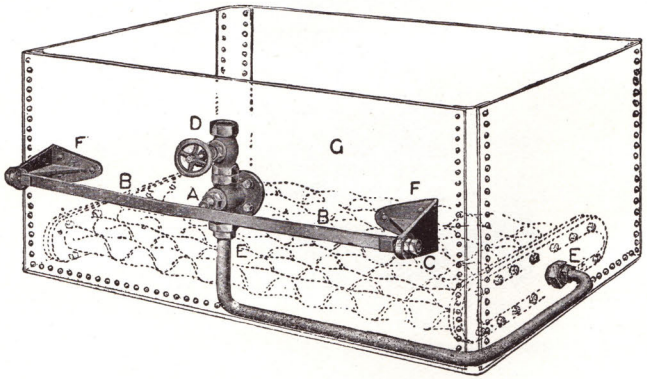
See Sectional Catalogue.

Boiling Batteries

ROW'S PATENT.



PERSPECTIVE VIEW of a BATTERY prepared for Exhaust Steam.



Showing application of Battery to a Tank fitted with Royle's Automatic Steam Control for regulating the temperature.

See Sectional Catalogue.

BOILING BATTERIES

FAR SUPERIOR TO COILS

Very successfully used for

HEATING TANKS
By live or exhaust steam.

Raising the Temperature of
:: **FEED WATER** ::

HEATING DYE BECKS

BLEACHING KIERS
(Securing a clean bleach)

BOILING OPERATIONS
of all kinds.

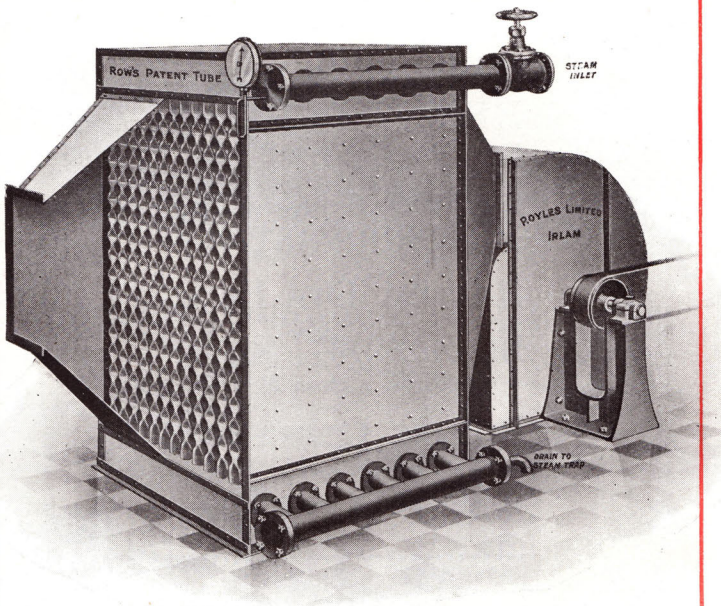
AS APPLIED TO BREWERIES, etc.

Prices quoted on receipt of the following :—

1. Quantity of water to be heated.
2. To what temperature.
3. In what time.
4. Steam pressure available.
5. Nature of the liquid.
6. Shape of vessel, with dimensions.
7. A sketch is useful.

Air Heaters

Row's Patent.



AIR HEATER and BLOWING FAN.

An example of a large number we have made for Yarn and Cloth Drying, Steam Removing.

Duties and Prices on application.

See Sectional Catalogue.

IRLAM, near MANCHESTER.

Air Heaters

ROW'S PATENT.

HIGH EFFICIENCY. VERY COMPACT.

Suitable for the
HIGHEST STEAM PRESSURES
OR EXHAUST STEAM.

No conflict between
STEAM AND CONDENSATION.

FOR—

All Heating and Drying Operations by means of Hot Air.
Warming Buildings, Workshops, etc.
Drying Yarn, Cloth, Wheat, Timber, etc.
Heating Turkish Baths.
Drying Clothes in Laundries, etc.

STEAM REMOVING FROM DYEWORKS.

Clear Atmosphere Guaranteed
Without Creating Draughts.

Duties and Prices on application.

See Sectional Catalogue.

IRLAM, near MANCHESTER.

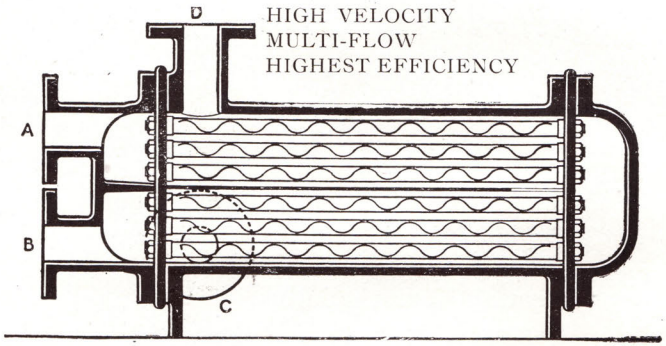
Oil Heaters and Coolers

ROW'S PATENT.

For Heating Fuel and Vegetable Oils to High Temperatures,

ALSO FOR

Cooling Lubricating and Transformer Oils.



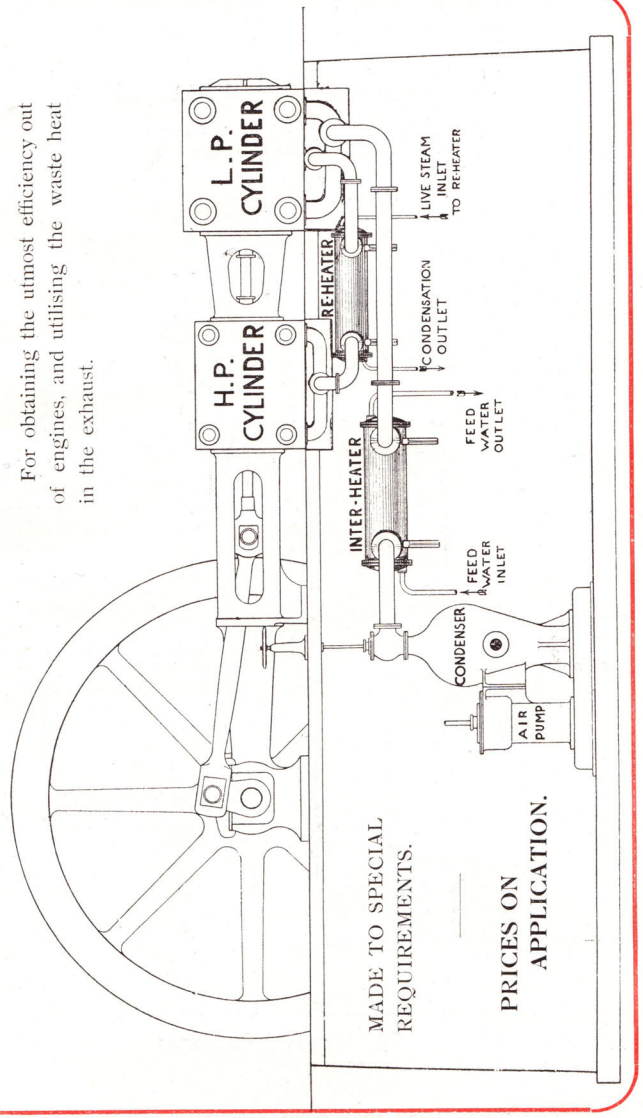
As used in conjunction with many oil burning appliances. Also specified by some of the largest builders of high-speed engines. May be arranged horizontally or vertically to suit individual requirements.

Where it is desired to arrange the cooling battery in the oil chamber itself the double efficiency of the "**Row**" **Tube** enables the best results to be obtained in the space available.

PRICES ON APPLICATION.

INTER-HEATERS and RE-HEATERS

For obtaining the utmost efficiency out of engines, and utilising the waste heat in the exhaust.

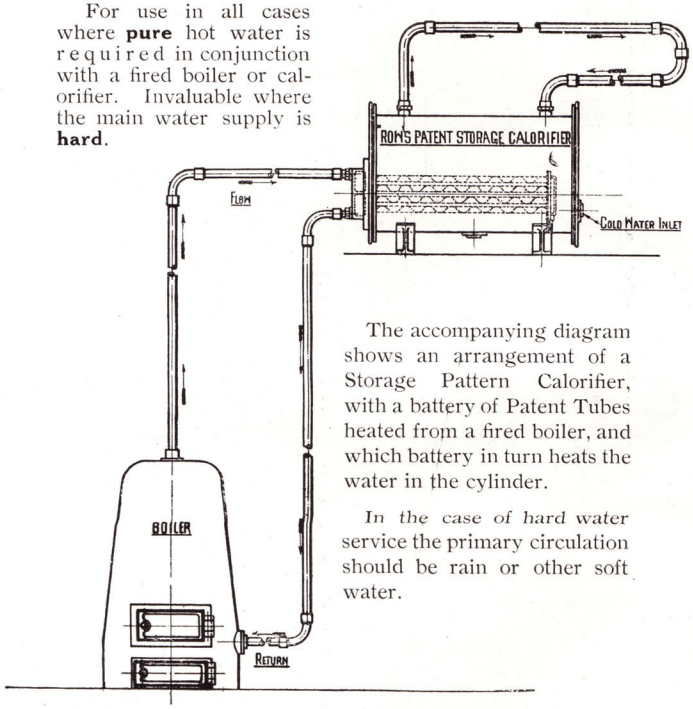


MADE TO SPECIAL REQUIREMENTS.

PRICES ON APPLICATION.

Secondary Heating of Water by Water

For use in all cases where **pure** hot water is required in conjunction with a fired boiler or calorifier. Invaluable where the main water supply is **hard**.



The accompanying diagram shows an arrangement of a Storage Pattern Calorifier, with a battery of Patent Tubes heated from a fired boiler, and which battery in turn heats the water in the cylinder.

In the case of hard water service the primary circulation should be rain or other soft water.

See Sectional Catalogue

SECTION 2.

STEAM TRAPS.

REDUCING VALVES.

SAFETY AND RELIEF VALVES.

STEAM PUMPS.

Condensation Receivers and Pumps.

AUTO-THERMAL FEED.

FLANGE COUPLINGS.

STEAM OVENS. OIL SEPARATORS.

BATH WATER BLENDERS.

SWIVEL UNIONS.

TEST PUMPS. TWIN STRAINERS. (Merrill's Patent.)

BOILER MOUNTINGS.

STEAM VALVES & FITTINGS.

Water Softening and Filtration.

BATH WATER PURIFICATION.

BATH FITTINGS.

ETC., ETC.

"SYPHONIA"

(Registered Trade Name)

Steam Traps

Royle's Patent.

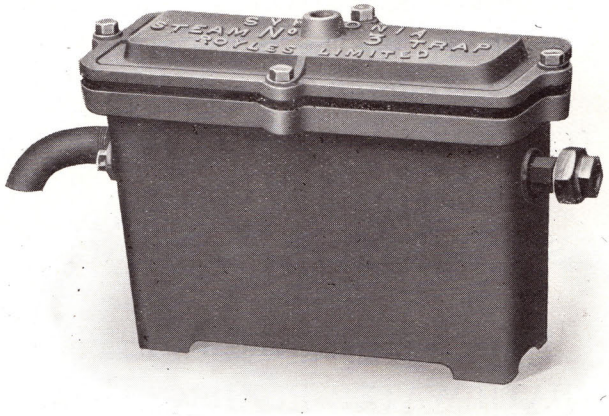
THE BEST "ALL-ROUND" TRAP, *i.e.*,

It will work well under a great variety of conditions and pressures for a longer time without trouble than any other system.

Over 200,000 Sold up to the end of 1922.

SPECIAL FEATURES:

1.—Will work at any pressure, without adjusting.
2.—No pressure in the box, no liability to burst.
3.—Easy of access.
4.—Easy to fix, inlet and outlet in line and in same plane.
5.—Only one wearing part, **Valve E,** and that is made interchangeable.
6.—Made in Nine Sizes, $\frac{3}{8}$-inch to 4-inches.



See Special Circular on how to select a Trap and useful DATA on Condensation and the Fixing of Steam Traps.

See Sectional Catalogue.

"Syphonia" Steam Traps

Royle's Patent.

GENERAL PRICE LIST.

Size of Inlet	Class A for ordinary Purposes.	Class B for High Pressures	Class C for Lifting Purposes	Class D with Blow Thro' Attachment	Class E fullway for low Pressures
Ins.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
$\frac{3}{8}$	2 0 0	—	—	—	—
$\frac{1}{2}$	2 15 0	3 10 0	3 17 6	3 17 6	4 2 6
$\frac{3}{4}$	3 7 6	4 10 0	4 17 6	4 17 6	5 0 0
1	4 2 6	5 5 0	5 17 6	5 17 6	6 0 0
$1\frac{1}{4}$	5 5 0	6 15 0	7 10 0	7 10 0	8 0 0
$1\frac{1}{2}$	6 10 6	8 10 0	9 10 0	9 10 0	11 5 0
2	10 0 0	13 10 0	15 0 0	15 0 0	21 0 0
3	19 10 0	26 0 0	28 10 0	28 10 0	33 0 0
4	31 10 0	—	—	—	—

Spare Inlet Valves for the above Traps.

Sizes ...	$\frac{3}{8}$"	$\frac{1}{2}$"	$\frac{3}{4}$"	1"	$1\frac{1}{4}$"	$1\frac{1}{2}$"	2"	3"	4"
For Class A ...	4/6	6/–	7/6	9/–	12/–	15/–	22/–	37/–	60/–
,, B C & D –	7/6	9/–	10/6	15/–	18/6	27/6	52/6	—	
,, E ...	—	9/–	12/–	15/–	22/6	37/6	60/–	90/–	—

Steam Traps—Royle's Patent.

Expansion Pattern, No. 77.

Size of Inlet	$\frac{1}{2}$"	1"	$1\frac{1}{2}$"
Price ...	£2 15 0	£4 2 6	£6 10 0

Expansion Pattern, No. 93.

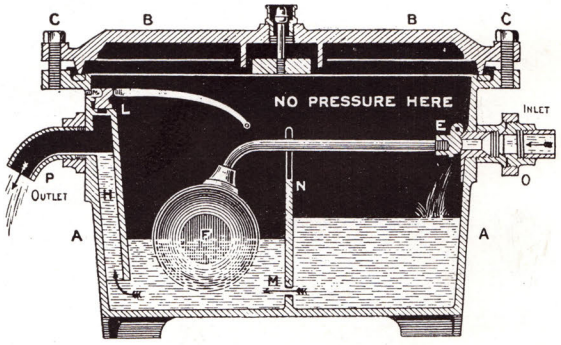
Size	$\frac{3}{8}$"	$\frac{1}{2}$"	$\frac{3}{4}$"	1"
Price	£1 2 6	£1 11 6	£2 5 0	£3 3 0

"Syphonia" Steam Traps

Royle's Patent.

Description.

The apparatus to be drained is connected to the Union **O,** the Trap is first filled with water and the lid fixed, Steam being now turned on, the water of condensation flows freely through the open Valve **E,** and out by the Syphon **H**. As soon, however, as the steam arrives, and the pressure tends to accumulate in the Trap, the water is forced up the Syphon **H,** the ball **F** following the water down, this partially closes the Valve **E.** In practice, the ball finds a position (so to speak) where it will pass all the condensed water, plus sufficient steam to fill the box. The Valve **E** never really closes. The Ball thus acts as a weight, and being made heavy and strong, is therefore not liable to collapse. **Every Trap is most thoroughly tested before being sent out.**



For fuller information See Sectional Catalogue.

"Syphonia" Steam Traps.

Royle's Patent.

Sizes made and Prices.

CLASS A.

For General Purposes and all Pressures under 100lbs.

No.	Inlet Size	Outlet Size	Maximum Working Pressure	PRICES £ s. d.	Code Word	Spare Valves
	Ins.	Ins.	Lbs.			
0	$\frac{3}{8}$	$\frac{1}{2}$	100	**2 0 0**	Abacist	**4/6**
1	$\frac{1}{2}$	$\frac{3}{4}$	100	**2 15 0**	Abacot	**6/-**
2	$\frac{3}{4}$	1	100	**3 7 6**	Abaft	**7/6**
3	1	$1\frac{1}{4}$	100	**4 2 6**	Abamita	**9/-**
4	$1\frac{1}{4}$	$1\frac{1}{2}$	100	**5 5 0**	Abatable	**12/-**
5	$1\frac{1}{2}$	2	80	**6 10 0**	Abatement	**15/-**
6	2	$2\frac{1}{2}$	80	**10 0 0**	Abature	**22/-**
7	3	4	80	**19 10 0**	Abbati	**37/-**
8	4	5	80	**31 10 0**	Abbevero	**60/-**

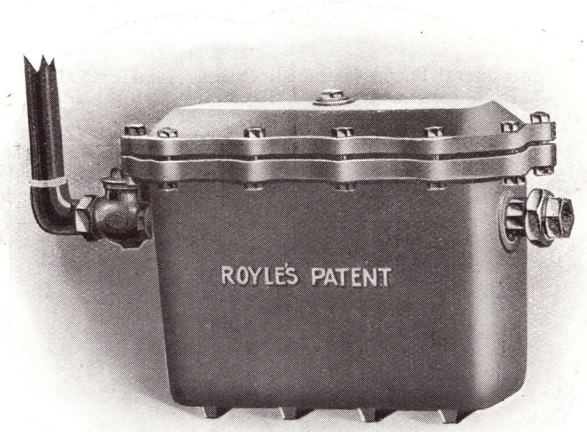
"Syphonia" Steam Traps.

Royle's Patent.

HIGH-PRESSURE PATTERN, Class B.

For Steam Pressure over **100 lbs.** per square inch.

Same principle as Class "A," but stronger built to suit the more onerous conditions. When fitted with Check Valve as seen in the illustration, it will lift the condensation to overhead tank.



When ordering, the Steam Pressure should be given. The Stock Sizes are suitable for pressures up to 200 lbs., beyond this they are made to order.

For further particulars see Catalogue.

"Syphonia" Steam Traps.

Royle's Patent.

Class B. for High Pressures.

Sizes made and Prices.

Inlet Size	Outlet Size	PRICE £ s. d.	Code Word Class C.	Code Word Class B	Spare Valves £ s. d.
Ins. ½	Ins. ½	3 10 0	Abeona	Abco	0 7 6
¾	¾	4 10 0	Abertawe	Abden	0 9 0
1	1	5 5 0	Abeyance	Abderian	0 10 6
1¼	1¼	6 15 0	Abiding	Abditory	0 15 0
1½	1½	8 10 0	Abietic	Abednego	0 18 6
2	2	13 10 0	Ability	Abel	1 7 6
3	3	26 0 0	Abelson	Abelmosk	2 12 6

CLASS C. For elevating condensation into overhead tanks. Same as "B" but fitted with Check Valve as illustrated, at the following extra prices.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	3 in.
7/6	7/6	12/6	15/-	£1 0 0	£1 10 0	£2 10 0

"Syphonia" Steam Traps.

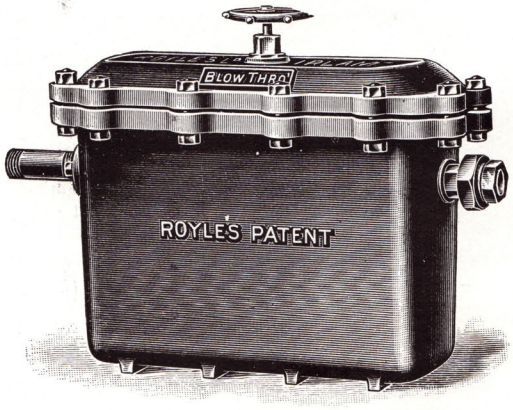
Royle's Patent.

"Blow-Through" Pattern, Class D.

This is the same Trap as the one described on preceding page; with the addition of the Hand-Wheel on the Cover, which operates mechanism within the Trap by which it may be "blown through" on starting. It is a most convenient Trap for use with Steam Coils, Engine Jackets, and all Steam Apparatus which it is desirable to blow through on starting up.

Made in 7 Sizes, from ½-inch to 3-inches.

In ordering Steam Traps, it is well to state the Pressure approximately under which the Traps require to work, so that suitable Traps may be sent.



SPARE VALVES for these Traps can be supplied at any time by quoting the Number on the Cover.

See Sectional Catalogue.

"Syphonia" Steam Traps

Royle's Patent.

Class D. "Blow-Through" Pattern.

Sizes made and Prices.

Size of Inlet	Size of Outlet	PRICE	Spare Valves
Ins.	Ins.	£ s. d.	£ s. d.
½	½	3 17 6	0 7 6
¾	¾	4 17 6	0 9 0
1	1	5 17 6	0 10 6
1¼	1¼	7 10 0	0 15 0
1½	1½	9 10 0	0 18 6
2	2	15 0 0	1 7 6
3	3	28 10 0	2 12 6

Class E. Full Way, Low Pressure Pattern

These are the same as Class "A," but the valve way is larger and fully equal to bore of inlet pipe. The box and the outlet are also proportionately larger. Very suitable for Drying Cylinder use and like conditions.

For Prices see page 47.

Expansion Steam Traps.

Royle's Patent.

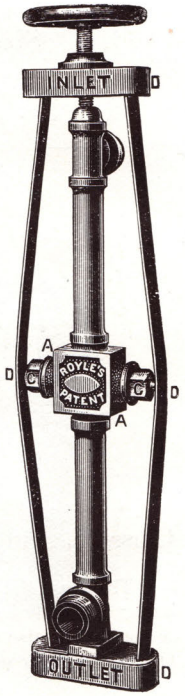
Pattern No. 77.

This Trap operates by the expansion of the Gun-Metal Central Tube, the movement being transferred to the Valve **A,** through the Bow-string Bracing Frame **D.**

The Bow-string formation of the Frame causes a greatly accelerated movement at the centre so that notwithstanding the comparatively slight expansion of the Central Tube the movement thrown on to the valves is considerable.

The Trap is at once the most compact and sensitive of its class, the 1-in. Trap only measuring 22 inches over all.

The Bow-string Frame can be removed at any time by slackening the hand-wheel, thus enabling the Valves in the Valve Box **A** to be readily got at for cleaning or repairs.



Expansion Traps have some advantages over other forms, notably, that they can be "set" to discharge the condensed water at any temperature. They are the best for discharging air. On the contrary, they are not to be recommended where there is much variation in the Steam Pressures, as they require re-setting for pressures if the change is considerable. These remarks apply to all forms of Expansion Traps.

Made in
3 sizes from ½ inch to 1½ inches.

FOR PRICES SEE PAGE 47

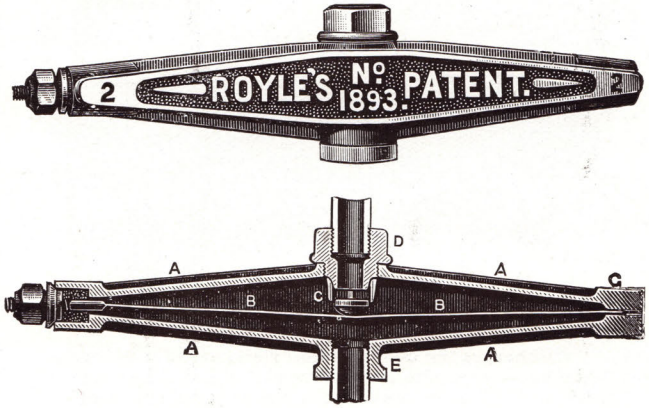
See Sectional Catalogue.

Expansion Steam Traps

Royle's Patent.

Pattern No. 93.

This is a modified form of the "Bow-string" Trap described on the preceding page. The body **A** of the Trap is of Gun-Metal, and the Tension or Bow-string Bar **B** of Steel. The Bar is renewable. The Valve is arranged as shown. On being put to work, the Nut on the free end of the bar **B** is tightened up until the Valve **C** comes to its seating, when the Trap is "set" and requires no further attention. It is a compact and cheap Trap, very suitable for Low Steam Pressures. For High Pressures the "Syphonia" Trap is better.



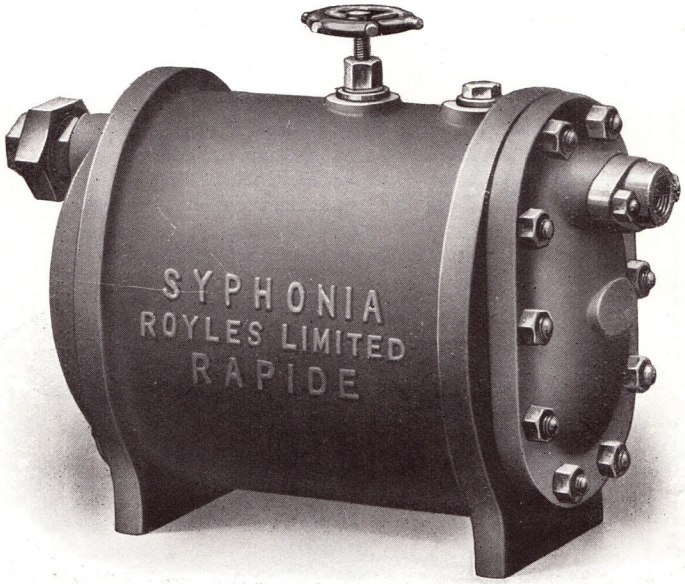
Made in 4 sizes from ⅜ inch to 1 inch.

FOR PRICES SEE PAGE 47.

See Sectional Catalogue.

"SYPHONIA RAPIDE" Steam Trap

Royle's Patent.

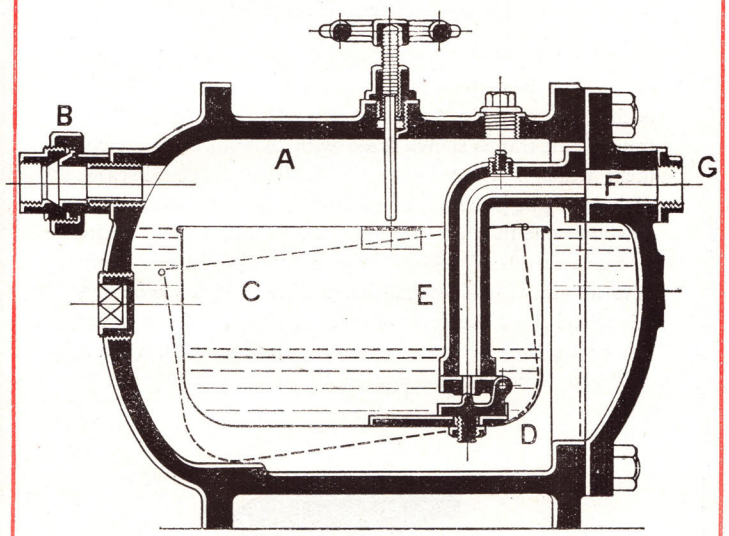


Discharges the condensation water rapidly as formed and without regard to temperature of water. The internal valve is similar to that used in the "SYPHONIA," and is operated by open float as illustrated. The "SYPHONIA RAPIDE" TRAP is designed to meet the conditions in connection with steam apparatus where the condensation water must be discharged as it is formed without holding up.

See Sectional Catalogue.

"SYPHONIA RAPIDE" Steam Trap

Royle's Patent.



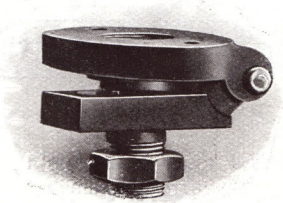
Description

The condensed water flows into the closed box **A** by the union inlet **B**, where it accumulates and overflowing the open float **C** destroys its buoyancy, so causing it to fall and open the syphonia valve **D** and discharge the water by syphon pipe **E** through the outlet **F**, fitted with flange coupling **G**. The valve closes sharply on the rise of the float **C**. The outlet **G** should be conveyed to some place where the noise of the discharge will not be an inconvenience. The illustration includes "blow-through" attachment.

"SYPHONIA RAPIDE" Steam Trap

Description.—Continued.

The "Syphonia" valve portion is interchangeable, and spares can be supplied at any time by quoting the size of the trap and series for which it is required. In the illustrations, the trap is shown fitted with blow-through attachment, which is charged extra. This is useful in certain cases such as engine jackets where it is desirable to blow through on starting, to thoroughly remove the air and water. It acts also as a means of testing the working of the trap at any time by screwing down the hand wheel. When working, this wheel should be kept well screwed back. Check valves can be supplied as extras, for fitting on the outlet, when it is desired to lift the condensation.



The "SYPHONIA" Hinged Valve.

See Sectional Catalogue

"SYPHONIA RAPIDE" Steam Trap

SIZES MADE AND PRICES.

Size of Inlet and Outlet in inches	PRICE £ s. d.	Extra for Spare Valve £ s. d.	Extra for Blow-through Attachment £ s. d.	Extra for Check Valve £ s. d.	Code Word
½	4 10 0	0 12 0	0 7 6	0 7 6	Araho
¾	6 0 0	0 15 0	0 7 6	0 7 6	Arama
1	7 10 0	0 18 0	0 7 6	0 12 6	Aramis
1¼	9 15 0	1 10 0	0 11 3	0 15 0	Ararat
1½	12 15 0	2 5 0	0 18 9	1 0 0	Arbib
2	21 15 0	3 15 0	1 2 6	1 10 0	Arbor

N.B.—When using the Code Word, prefix "X," "L" or "H" to indicate which series of that particular size is required.

Capacities.

Size of Inlet and Outlet in inches	Approximate Discharge in lbs. per hour					
	X.L.P. Series		L.P. Series		H.P. Series	
	5 lbs.	20 lbs.	20 lbs.	80 lbs.	80 lbs.	160 lbs.
½	1,100	1,500	900	1,750	1,200	1,800
¾	2,250	3,000	1,800	3,600	1,500	2,800
1	3,100	5,000	3,400	7,500	2,300	3,800
1¼	4,750	7,000	6,750	11,500	6,500	7,750
1½	11,000	14,000	9,500	20,000	8,000	13,700
2	14,750	20,000	17,000	40,000	11,000	19,300

for further particulars.

VACUUM AND SUPER-LIFTING TRAP

Royle's Patent.

In draining vessels under vacuum, a difficulty arises in releasing the condensed water to atmosphere. This is usually met by valve mechanism which puts the trap into communication with the vacuum when filling, and destroys the vacuum by **admitting air during the discharge**. This air finds its way to the condenser when the trap reverses, and is obviously **not good for the vacuum**.

The special feature of the **Royle's Patent Vacuum Trap** is that **no air can enter the trap**, the water being discharged to atmosphere by **admitting a supply of live steam** to destroy the vacuum and **discharge to atmosphere**. This arrangement has the additional advantage that the **condensed water can be elevated** into overhead tanks or discharged at a distance from the trap.

The same mechanism is also useful for discharging water from low pressure drips into tanks much beyond the heights that a trap would discharge naturally. The employment of a supply of live steam to do the lifting is a novel feature in traps working under these conditions, and is named the "Super-Lifting" action. It should be clearly understood that the apparatus is **not** in itself a Steam Trap.

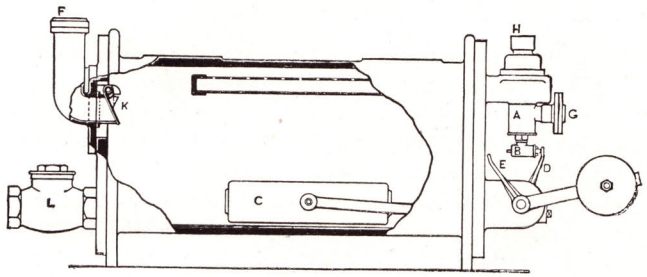
Sizes made and Prices.

Diameter of Inlet and Outlet	DISCHARGE PER HOUR		PRICE	Code Word
	As Vacuum Trap	As Super-lifting Trap		
inches	Gallons	Gallons	£	
1	150	250	**30**	Vacone
1½	350	500	**40**	Vacondem
2	750	1,000	**50**	Vacto
2½	1,350	2,000	**70**	Vactodem
3	2,000	3,000	**100**	Vactree

See Sectional Catalogue

VACUUM AND SUPER-LIFTING TRAP

Royle's Patent.



Description.

The chief feature of this trap is the steam-moved valve mechanism **A**, in which the steam and exhaust valves are controlled by a balanced valve **B** operated by the float **C**, through the tappet levers **D** and **E**. By this means the float is only called upon to exert the small effort required to move the balanced valve referred to above.

Working as a Vacuum Trap the condensation inlet is at **F**. The steam supply is connected at **G** and the exhaust **H** to the vacuum vessel above the highest point where the water collects. This pipe is intended to establish an equilibrium between the trap and the vacuum vessel.

Assuming the trap to be empty, the float **C** will be in its lowest position as shown. The exhaust valve being open the trap is in equilibrium with the vacuum vessel, and the condensation enters through the check valve **K**. The float rises, and as the trap becomes full, opens the valve **B** by tappet **E**, which causes the main steam valve to open, at the same time closing the exhaust. The steam admitted first destroys the vacuum and then expels the water through the outlet check valve and may elevate it if desired.

As the float reaches its lowest position the valve **B** is again closed by tappet **D**, thus closing the steam valve and opening the exhaust, which again places the trap in equilibrium with the vacuum vessel and the cycle is repeated.

For further particulars see Sectional Catalogue.

Surplus Valve

Royle's Patent.

AS its name implies, this is a valve for passing over "surplus" steam from, say, a high-pressure boiler into a boiler of lower pressure or a low-pressure main. It is a most useful valve, and properly installed, is capable of effecting considerable economy in steam coal consumption and affording relief to low-pressure boilers which may be hard pressed for steam. The idea is that there exists a H.P. boiler carrying, say, 150 lbs., and which is capable of yielding more steam than is required at 150 lbs., whilst alongside is a low-pressure boiler, say at 50 lbs., hard pressed for steam. These two boilers may be coupled and the steam generated in the H.P. boiler over and above the 150 lbs., be passed over into the L.P. boiler, and so relieve it to that extent. How much it relieves it will obviously depend upon the firing of the H.P. boiler ; it really blows off into the L.P. boiler instead of to atmosphere. It is important to observe that no steam can pass from the H.P. boiler to the L.P. until the 150 lbs. is exceeded ; the L.P. boiler simply receives what the H.P. has to spare. It cannot be drawn down by the L.P. boiler. Its function is **not** to keep "up" the L.P. boiler at the expense of the H.P. boiler, but to **retain** the full pressure in the H.P. boiler and to pass over whatever steam the H.P. has to spare to help the L.P. It is **not** a reducing valve. Much confusion seems to exist in distinguishing between the two instruments.

We have installed a considerable number of these Valves with excellent results.

For further particulars see Sectional Catalogue.

Reducing Valves

Royle's Patent.

SUITABLE FOR STEAM, AIR OR WATER

IN this branch of Engineering we have probably the largest and most varied experience of any firm in the country. The Valves described on the following pages are to be relied upon to perform the duties specified. In ordering, the fullest information should be given as to the inlet pressure and the Reduced pressure desired, and the purpose for which the Valve is required.

Most sizes are either in stock or in process of manufacture, and orders can be filled promptly.

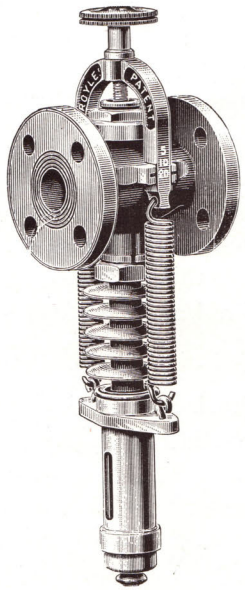
MANY THOUSANDS IN USE.

See Sectional Catalogue.

ROYLE'S "1902" PATENT.

Reducing and Safety Valve

REDUCING VALVE and SAFETY VALVE IN ONE ARTICLE AT THE PRICE OF ONE.



This Valve is an entire departure in Reducing Valve Construction. For details the reader is referred to our large lists, sent free on application, but its special features may be summarised as follows :

1.—An efficient Reducing Valve without any parts liable to stick or give trouble in working.

2.—It is also an efficient Safety Valve, guarding against over-pressure.

3.—Easily adjustable by the hand-wheel on top. Reduced pressure can be varied at will.

4.—Alteration of reduced pressure re-sets the Safety Valve at one operation.

5.—Cannot be overloaded.

A Reducing Valve ought always to be followed by a Safety Valve. Some serious explosions have arisen from neglect of this precaution. It is here combined in one instrument at the price of Reducing Valve only.

See Sectional Catalogue.

ROYLE'S "1902" PATENT

Reducing and Safety Valve

SIZES MADE AND PRICES.

Sizes of Inlet and Outlet	Diameter of Flanges	Distance from Face to Face of Flanges	PRICE £ s. d.	Code Word without Counter Flange	Extra for Counter-Flanges and Bolts
Ins.	Ins.	Ins.			
½	3	3	2 12 6	Bipedal	3/9
¾	3½	3¼	3 0 0	Biphase	3/9
1	4	4⅜	3 15 0	Birrone	4/6
1¼	4½	5¼	4 12 6	Biscay	5/3
1½	5	6	5 12 6	Biscotin	6/–
2	6½	7¾	7 10 0	Bismuth	7/6
2½	7¼	9⅜	9 7 6	Bison	9/–
3	8	10¾	11 5 0	Bisque	12/–
4	9	12¼	15 0 0	Bissac	18/–

*Kindly Note.—Sizes 2 in. and above are made with Iron Bodies and Bronze working parts. All the other sizes Bronze throughout.

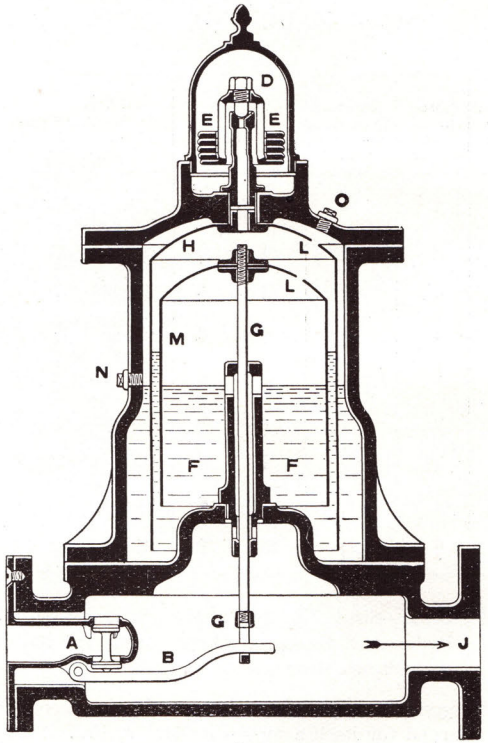
For general purposes this is the valve we recommend. It has earned for itself a most excellent record. Since its introduction in 1902 over 15,000 have been sold up to the end of 1922.

Reducing Valves

ROYLE'S PATENT. CLASS "1905 A."

Suitable for boiler pressure of 80 lbs. and under. For higher pressures see Class "1905 B" and "1905 C."

Very Sensitive—Recommended for very low reductions down to Atmosphere.



Section "1905 A."

See Sectional Catalogue.

ROYLE'S PATENT.

Reducing Valves.

CLASS "1905 A."

SIZES MADE AND PRICES.

THE PRESSURE GAUGE IS NOT INCLUDED IN THE PRICE.

Bore of Inlet	Bore of Outlet	Diameter of Inlet Flanges	Diameter of Outlet Flanges	Size and No. of Bolts Prepared for	Diameter of Pitch Circle	Length between Flanges	Extreme height from Centre line to Top	PRICE	Code Word
				Ft. In.	In.	Ft. In.	Ft. In.	£ s. d.	
In.	In.	In.	In.						
1	1	5¼	5¼	4 × 5/8	3 7/8	1 0	1 5	6 0 0	Bacchante
1¼	1¼	5½	5½	4 × 5/8	4 1/8	1 1	1 5	7 10 0	Bacchus
1½	1½	6¼	6½	4 × 5/8	5	1 2½	1 8	9 0 0	Baggage
2	2	7¼	7¼	8 × 5/8	5 3/4	1 5	1 10	12 0 0	Bagot
3	4	9	9	8 × 5/8	7½	1 7	2 1	18 0 0	Bagreef
4	5	11	11	8 × 3/4	9¼	1 9	2 3	24 0 0	Balcony
5	6	12	12	12 × 3/4	10¼	2 0	2 9	30 0 0	Balliol
6	7	13¼	13¼	12 × 3/4	11½	2 6	3 3	36 0 0	Balm
7	8	14½	14½	12 × 3/4	12 3/4	2 9	3 6	42 0 0	Balmert
8	9	16	16	12 × 7/8	14	3 0	4 0	48 0 0	Bamboo

Extra for Pressure Gauge and Syphon : 4 in. £1 10s. 0d. 6 in. £1 15s. 0d.

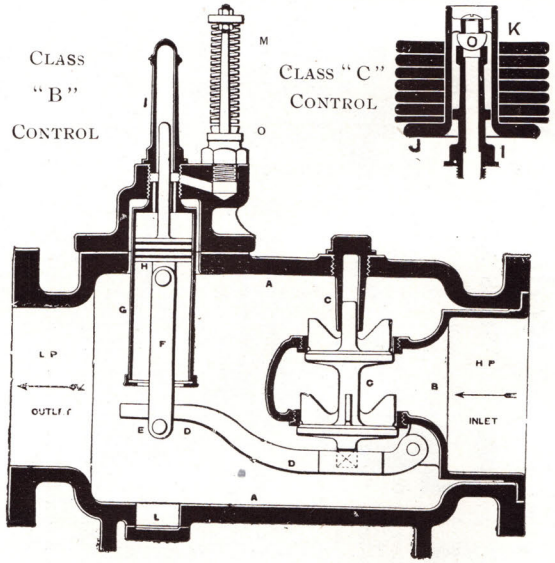
See Sectional Catalogue.

Reducing Valves

Royle's Patents. **Class "1905 B & C"**

BRIEF DESCRIPTION. The blowing point of the Control Valve O is the reduced pressure, and may be varied by adjusting the spring M on Patt "B" or the weights "K" on Patt "C." A slack-fitting piston H through link F and lever D works the main Valve C. Piston H always tends to fall and open Valve C, and consequently lift the control Valve O. As soon as the escape at O equals the leak past H the piston comes to rest and that determines the reduced pressure.

A WELL-TRIED PRINCIPLE.



When ordering give the boiler and reduced pressure.
For fuller information please ask for our sectional Catalogue on Reducing Valves.

See Sectional Catalogue.

Reducing Valves

Royle's Patent.

Class "1905 B and C."

Suitable for the Highest Boiler Pressures.

Class "B" for Reduced Pressures **above** 50 lb. sq. in.
Class "C" for Reduced Pressures **below** 50 lb. sq. in.

SIZES MADE AND PRICES.

Bore of Inlet	Bore of Outlet	PRICES. £ s. d.	Code Word Class B	Code Word Class C
Ins.	Ins.			
½	½	**2 12 6**	Banoge	Besnel
¾	¾	**3 0 0**	Barilla	Bespoke
1	1	**3 15 0**	Basera	Besought
1¼	1¼	**4 12 6**	Basin	Belton
1½	1½	**5 12 6**	Basma	Besson
2	2	**7 10 0**	Basoda	Betterave
2½	2½	**9 7 6**	Begum	Betterment
3	3	**11 5 0**	Bekos	Betulla
4	4	**15 0 0**	Belfry	Beulah
5	5	**19 0 0**	Belmont	Beverage
6	6	**22 10 0**	Beltana	Biceps
7	7	**26 0 0**	Baudet	Bicorned
8	8	**30 0 0**	Beaver	Bidgood
9	9	**34 0 0**	Bective	Bilbao
10	10	**40 0 0**	Bencor	Billows
11	11	**44 0 0**	Bepen	Beleven
12	12	**49 0 0**	Berk	Binocle
13	13	**52 10 0**	Betirn	Birteen
14	14	**57 0 0**	Biotto	Biogen
16	16	**67 10 0**	Bistre	Bissula

Extra for Pressure Gauge and Syphon : 4 in. **£1 10s. 0d.**
6 in. **£1 15s. 0d.**

PRICES OF LARGER SIZES ON APPLICATION.

Reducing Valves

ROYLE'S PATENT "ATMOSPHERIC" PATTERN.

Specially designed for reducing down to atmosphere or under, or as a Make-up Valve for Turbines, etc., etc.

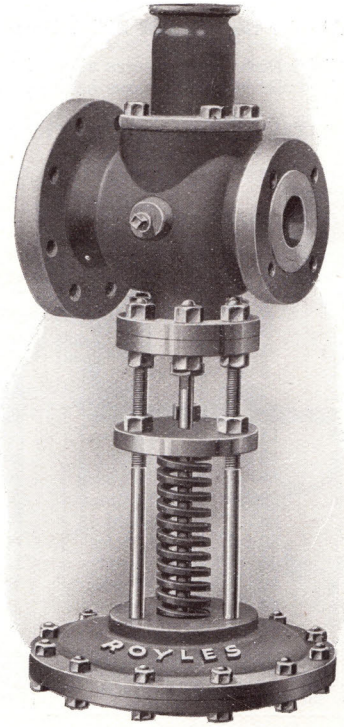


Fig 1.

See Sectional Catalogue.

Reducing Valves

ROYLE'S PATENT. "ATMOSPHERIC" PATTERN.

SIZES MADE AND PRICES.

The Pressure Gauge is not included in the price.

INLET				OUTLET					PRICE			Code Word
Bore	Dia. of Flange	No. and Size of Bolts	Dia. of Pitch Circle	Bore	Dia. of Flange	No. and Size of Bolts	Dia. of Pitch Circle	Length over Flanges	£	s.	d.	
in.	in.	in.	in.	in.	in.	ins.	in.	in.				
1	5	6—$\frac{5}{8}$	$3\frac{3}{4}$	2	$6\frac{1}{2}$	4—$\frac{5}{8}$	5	$7\frac{3}{4}$	**10**	**0**	**0**	Board
$1\frac{1}{2}$	6	4—$\frac{5}{8}$	$4\frac{1}{2}$	3	8	4—$\frac{5}{8}$	$6\frac{1}{2}$	$9\frac{1}{2}$	**15**	**0**	**0**	Bobbin
2	$6\frac{1}{2}$	4—$\frac{5}{8}$	5	4	9	8—$\frac{5}{8}$	$7\frac{1}{2}$	$10\frac{1}{4}$	**20**	**0**	**0**	Bock
$2\frac{1}{2}$	$7\frac{1}{4}$	8—$\frac{5}{8}$	$5\frac{3}{4}$	5	11	8—$\frac{5}{8}$	$9\frac{1}{4}$	11	**25**	**0**	**0**	Bodkin
3	8	8—$\frac{5}{8}$	$6\frac{1}{2}$	6	12	8—$\frac{5}{8}$	$10\frac{1}{4}$	11	**30**	**0**	**0**	Bolt
4	9	8—$\frac{5}{8}$	$7\frac{1}{2}$	8	$14\frac{1}{2}$	8—$\frac{5}{8}$	$12\frac{1}{4}$	$13\frac{1}{2}$	**40**	**0**	**0**	Bomb
5	11	8—$\frac{3}{4}$	$9\frac{1}{4}$	10	17	8—$\frac{3}{4}$	15	$16\frac{1}{4}$	**50**	**0**	**0**	Bottle
6	12	12—$\frac{3}{4}$	$10\frac{1}{4}$	12	$19\frac{1}{4}$	12—$\frac{3}{4}$	$17\frac{1}{4}$	18	**60**	**0**	**0**	Box

Extra for Pressure Gauge and Syphon : 4 in. £**1** **10**s. **0**d. 6 in. £**1** **15**s. **0**d.

Twin Strainer

Merrill's Patent. **Removable Basket Type.**

For use on suction pipes in connection with Injectors, and all types of Pumps for industrial and domestic supplies, Boiler Feeding, Condensing Plants, Ship Bilges, and all cases requiring continuous straining of the liquid being pumped.

Consists of two strainers in one case, which are alternately thrown in and out of action by operating a pair of Valves, the one side of the strainer not in use being accessible for cleaning.

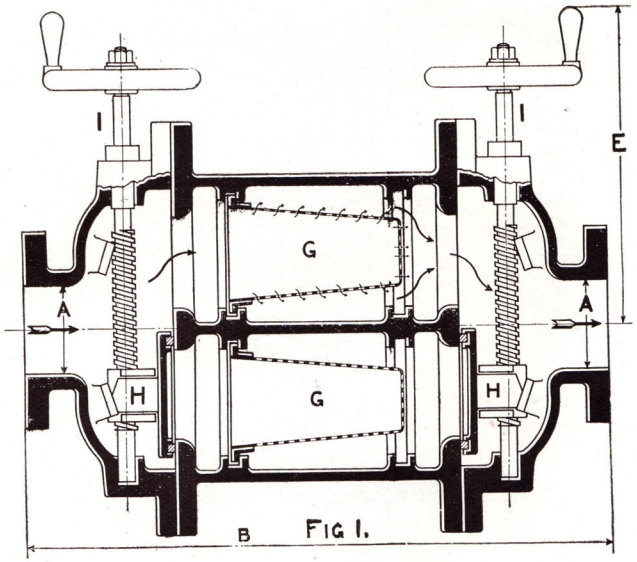


FIG I.

See Sectional Catalogue.

Twin Strainer

Merrill's Patent. **Removable Basket Type.**

Prices and Approximate Dimensions.

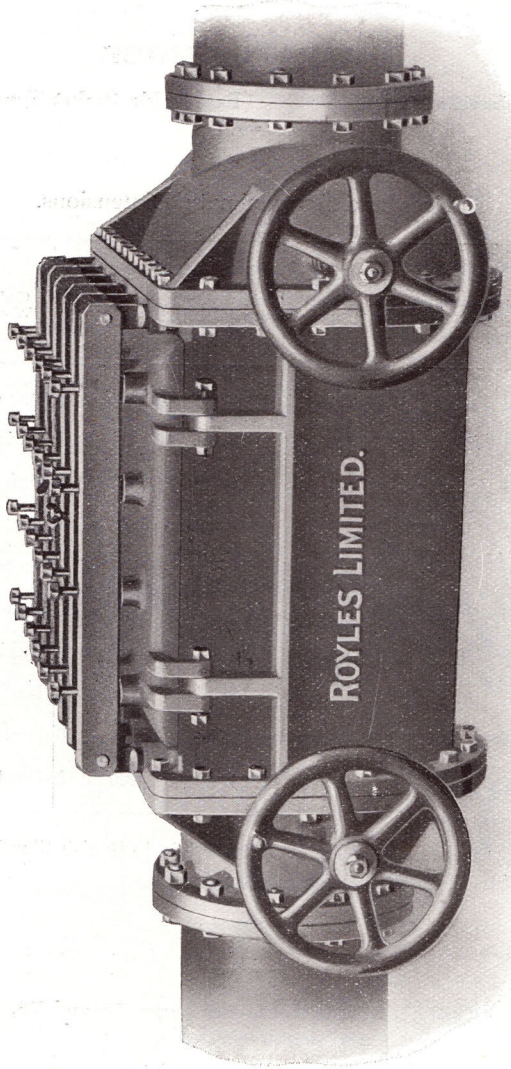
Size A	Length over Flanges B	Length of Body C	Width of Body D	Dimensions over Hand-wheel E	Dimensions over Straps F	PRICE £ s. d.	Code Word
In.	Ft. In.	Ft. In	Ft. In.	Ft. In.	Ft. In.		
2	1 6 3/8	1 0 1/2	0 8	0 10 3/4	0 6 3/4	**15 0 0**	Daco
3	1 9 7/8	1 2 3/4	0 9 1/2	1 0 1/2	0 7 3/4	**21 0 0**	Dado
4	2 0 1/2	1 6 1/2	0 11 3/4	1 2	0 8 3/4	**28 0 0**	Dafen
5	2 4 1/2	1 9 1/4	1 1 1/4	1 4	0 10	**35 0 0**	Dager
6	2 8 1/4	2 0 1/4	1 3	1 7	0 11 1/2	**40 0 0**	Dagma
8	3 2 3/4	2 5	1 5 1/4	1 10	1 1	**58 0 0**	Dano
10	3 8 1/2	2 10 1/2	1 8 1/8	2 1 3/4	1 2 1/4	**76 0 0**	Dakin
12	4 2 3/4	3 2	1 10	2 3 3/4	1 3	**100 0 0**	Dando
14	4 8 3/4	3 5 3/4	1 11 1/2	2 5 3/4	1 5 1/4	**130 0 0**	Dane
16	5 3	4 0 1/4	2 3 1/8	2 10 5/8	1 8	**160 0 0**	Danton

Diameter of Flanges and Drilling to British Standard, Table II. unless otherwise ordered.

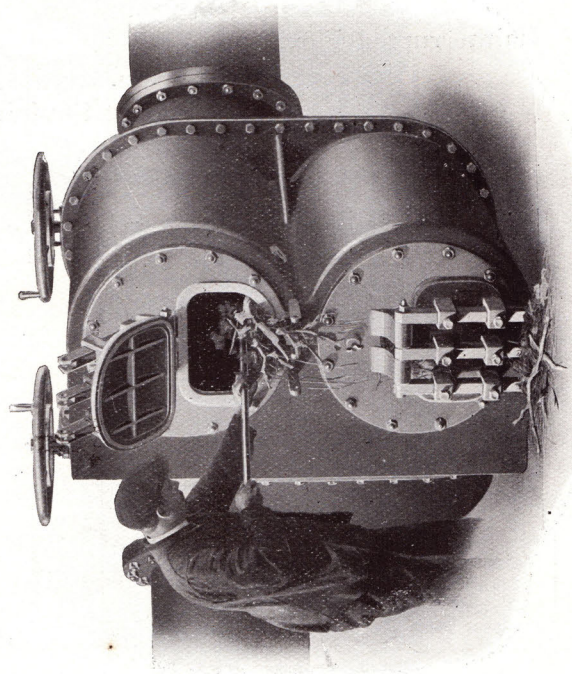
LARGER SIZES MADE.

SINGLE STRAINERS—See pages 78 and 79, also Sectional Catalogue.

Twin Strainer—Perspective View.



Twin Strainer—Fixed Basket Type.



Cast-Iron Twin Strainer
FOR
Oil-Fuel Pipe Lines.

Uninterrupted Flow.
Ease of Manipulation.
Perfect Straining.

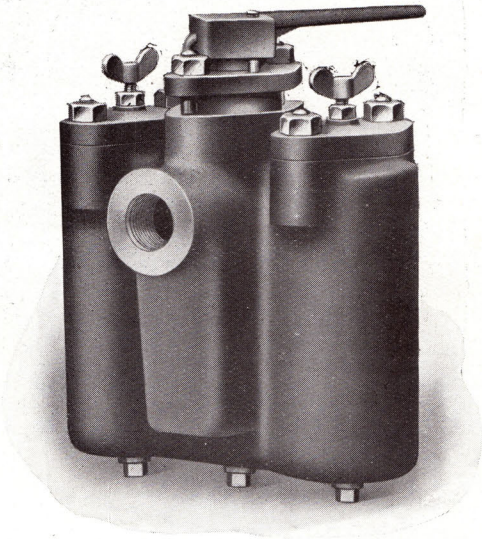


Fig. 1.

This follows the lines of our widely adopted Twin Strainer, and has been specially designed to include its principal features, with the utmost compactness and ease of operation.

Cast-Iron Twin Strainer
(CONTINUED).

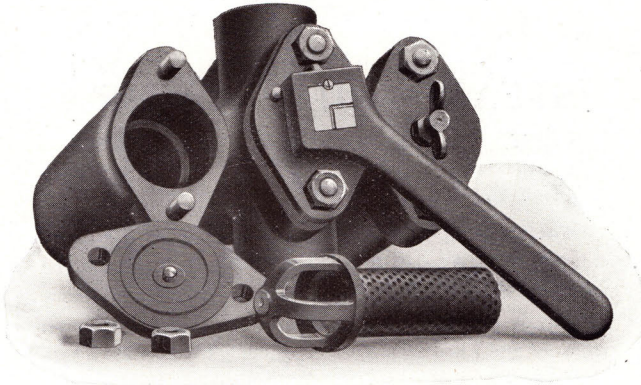


Fig. 2.

It is made throughout in best quality close grained cast-iron, with well ground in G.M. plug, bush and stuffing box and malleable-iron handle. Cages of perforated copper, lined with fine mesh copper gauze if required.

Fig. 1. shows a perspective view of the strainer from the outlet side. The flow of oil through the individual strainers is simply and efficiently controlled by a quarter turn of the centrally disposed plug cock.

Fig. 2 is a semi-plan view and shows the ease with which the strainer cages may be removed—merely unscrew two nuts, lift off cover and withdraw cage. Meanwhile the flow of oil continues uninterruptedly through the other strainer. Note also the marking on the plug cock to indicate the direction of flow.

SIZES MADE AND PRICES.

No.	Inlet and Outlet tapped Gas.	PRICE £ s. d.	Approx. over all size (without handle)
1	$\frac{3}{4}$ in. or 1 in.	9 0 0	11 in. × 9½ in. × 6½ in.
2	1¼ in. or 1½ in.	12 0 0	13 in. × 11 in. × 8½ in.

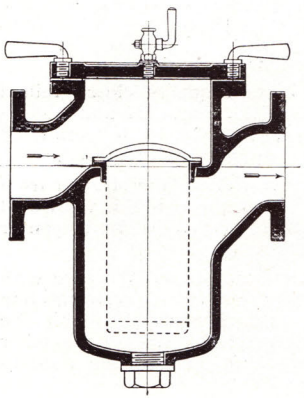
Single Strainers

FOR

STEAM — OIL — WATER.

Cast or Wrought-Iron Pipes.

For inserting in pipe lines to arrest dirt or foreign matter. May be used in all cases where the plant may be stopped to allow cleaning of the cages. Where continuous working is essential, see particulars of our Twin Strainer, pages 72 and 73.



Type "A"

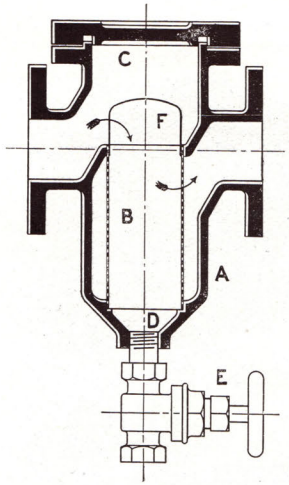
For Cast-iron pipes.
Low-pressure water service.
Cover held on by fly-bolts for rapid opening.
Handles for lifting.
Cast-iron body.
Perforated Brass Cage.

SIZES MADE AND PRICES.

Size	2½ in.	3 in.	4 in.	5 in.	6 in.
Price	£6 15 0	£9 0 0	£10 10 0	£12 10 0	£13 10 0
Spare Cage	9/-	12/-	15/-	18/-	22/6

See Sectional Catalogue.

Single Strainers



Type "B"

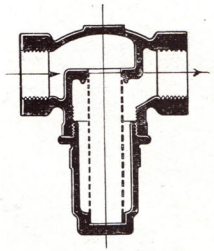
For Steam or Water. Bolted Cover. Cage arranged with open bottom so that dirt may be blown down by opening valve.

Sizes
¾" to 1½" Screwed Ends.
2" to 4" Flanged Ends to B.S. Table II.

The Prices shown do **not** include the valve.

SIZES MADE AND PRICES.

Size	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.
Price	£2 15 0	£3 0 0	£3 7 6	£3 15 0	£4 17 6	£5 17 6	£8 5 0
Spare Cage	2/6	3/6	5/-	6/6	8/6	12/-	15/-



Type "C"

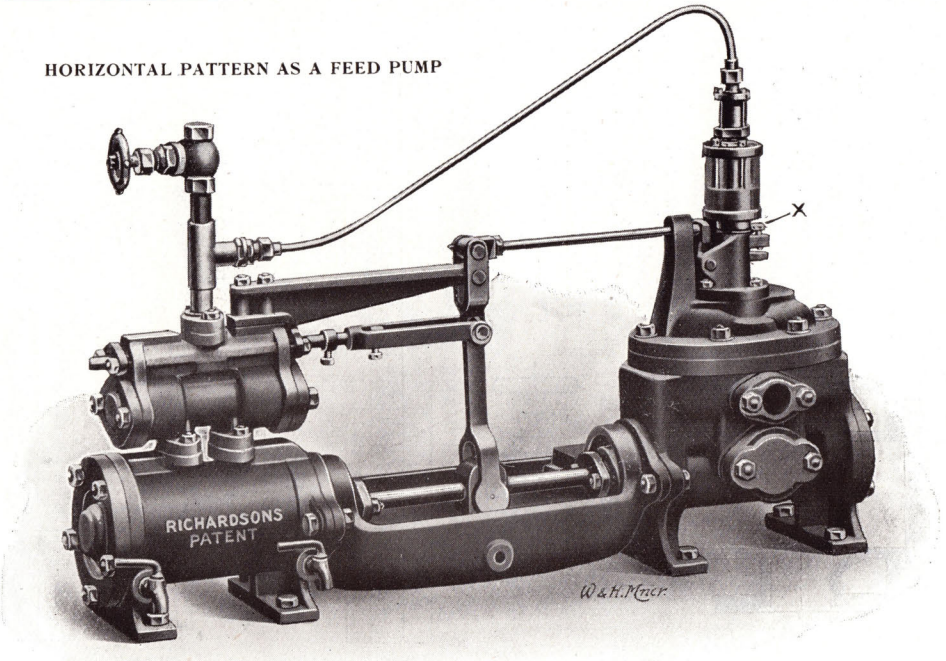
For Wrought-iron Pipes, Screwed Ends.

Made in Gun-Metal throughout.

Size	½ in.	¾ ins.	1 in.	1¼ in.	1½ in.	2 in.
Price	12/-	15/-	18/6	26/-	37/6	52/6
Spare Cage	2/3	2/6	3/-	4/6	6/-	7/6

See Sectional Catalogue.

HORIZONTAL PATTERN AS A FEED PUMP



Direct-acting Steam Pumps

Richardson's Patent.

For Boiler Feeding & General Use with Automatic Self-lubricating Device.

SPECIAL FEATURES.—This Patent Pump is of the direct reciprocating type, having all the admittedly good features of that class, viz.: long stroke and slow steady action, and a positiveness of movement not hitherto attainable. This is brought about by an entirely new method of working the auxiliary valve.

SIZES MADE AND PRICES.

No.	Capacity per hour	PRICE—Horizontal Pattern made as a feed pump and complete with Auto-Lubricator.	Code Word
	Gallons	£ s. d.	
1	500	..... **Prices on**	Dazzle
2	1,000	.....	Deacon
3	1,500	..... **Application.**	Deals
4	2,000	....	Dean

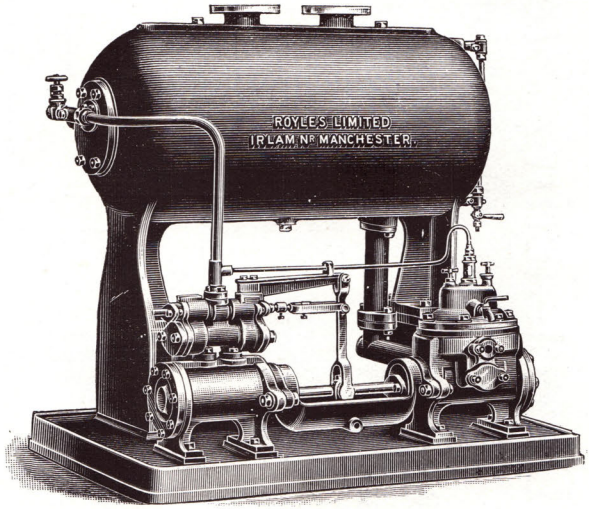
See Sectional Catalogue.

Automatic Receiver
And FEED PUMP.

Richardson's Patent.

For receiving the water of condensation from Heating Systems of all kinds, Steam Jackets, Boiling Batteries or Coils, and Steam Traps, and automatically feeding the water direct to Boiler whilst hot, thus affecting a considerable economy of fuel and water.

The hot water from the heating system, coming either direct or through Steam Traps, as may be necessary, is led into receiver by the pipes shown on top. A simple and efficient form of float device controls the speed of the pump to suit the quantity of water coming to receiver.



See Sectional Catalogue.

Automatic Receiver
AND
Feed Pump

Sizes made and Prices.

No.	Quantity of Condensation deal with per hour in Gallons at 50lbs.steam pressure or over	Price including Auto-Lubricator	CODE WORD
1	500	**PRICES ON APPLICATION.**	Dearne
2	1000		Debate
3	1500		Decair
4	2000		Dechet

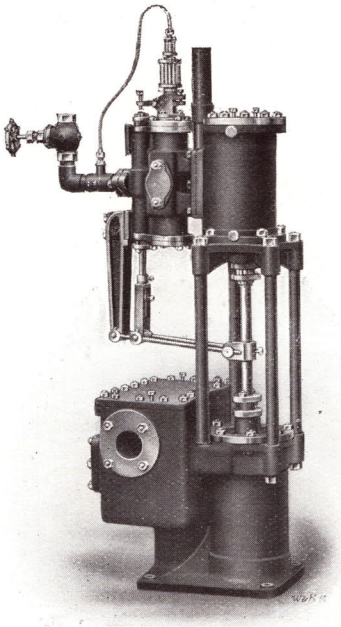
PARTICULARS OF OTHER SIZES ON APPLICATION.

See Sectional Catalogue.

Direct-acting Steam Pumps

Richardson's Patent.

(CONTINUED).

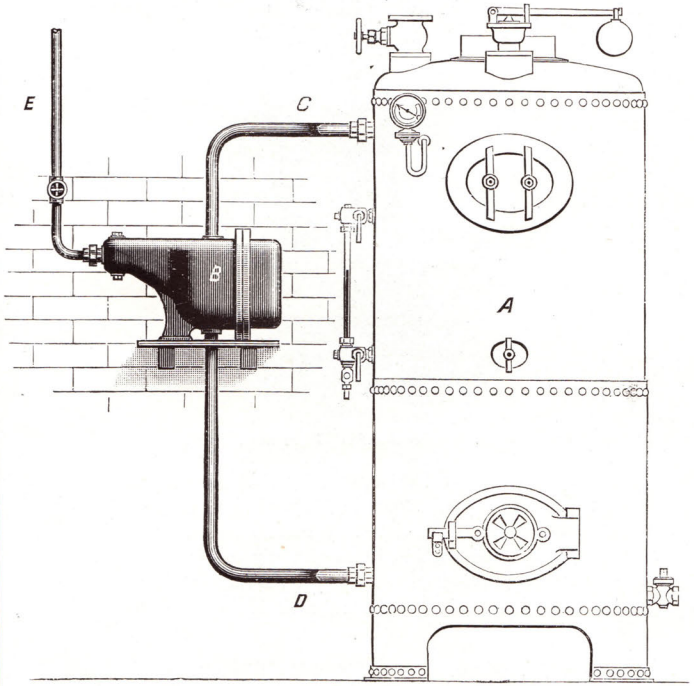


Vertical Pattern arranged as a Circulating Pump.

Prices of Vertical Pattern on application.

Automatic Boiler Feeder

For automatically supplying Feed Water to Steam Boilers, Evaporators, etc., where it is necessary to keep a constant level of water without skilled attention.



In ordering state the size of boiler, or amount of evaporation per hour, and the town's water pressure. If fed from a cistern state height of same above water line in boiler.

PRICE—For steam pressures up to 25 lbs. - **£4 10 0**
" " above 25 lbs. - **£7 0 0**

See Sectional Catalogue.

Sight-Feed Lubricators

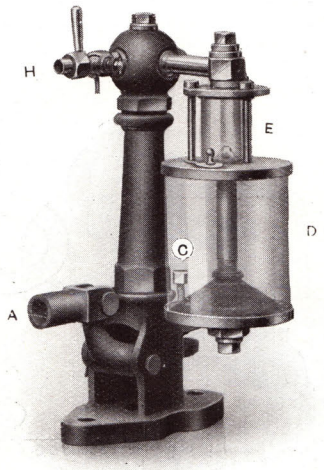


Fig. 1. Mechanical Type Sight-Feed.

The Lubricator is operated by the lever **A,** which is actuated from any reciprocating part of an engine or pump. The rate of feed is regulated by means of the set-screw **C.** The sight-feed glass **E** is filled with glycerine and the oil is drawn through this from the container **D** into the pedestal top. It is then forced via the 3-way cock **H** and into the steam pipe.

N.B.—The sight-feed and container glasses being on the suction side are **not** subject to any pressure.

Capacity	½ Pint
Price	£4 0 0
Code Word	Decimal

See Sectional Catalogue.

Sight-Feed Lubricators

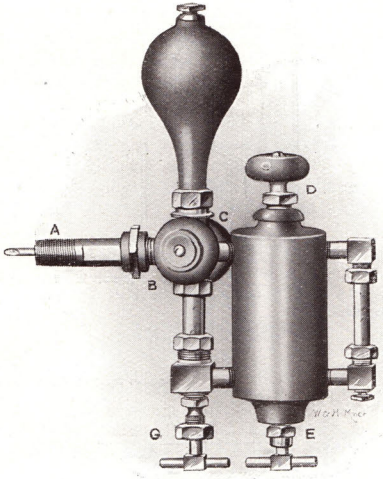


Fig. 2. Gravity Type, Sight-Feed.

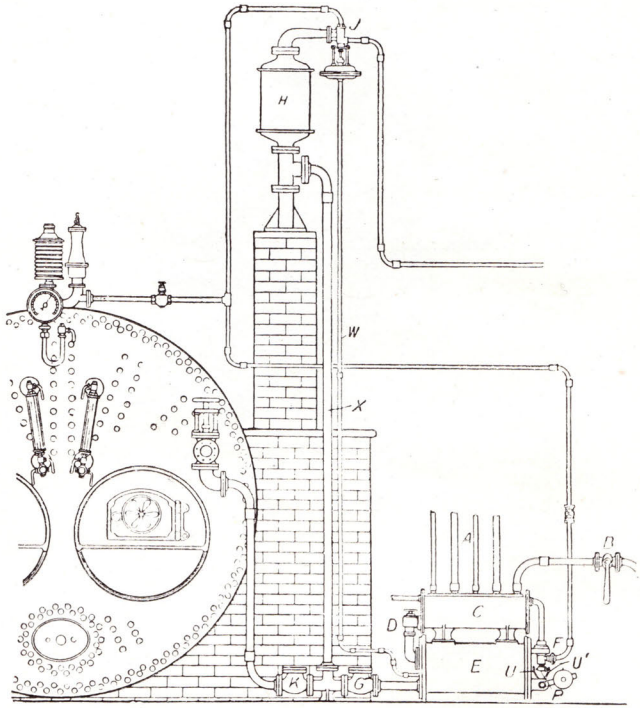
Fig. 2 is one of the simplest forms of the displacement Sight-Feed Lubricators. The feed is indicated by the oil rising through the left-hand water gauge whilst the total amount of oil in the cup is shown in the right glass.

Capacity	½ pint.
PRICE	£4 0 0
Code Word	Decosta.

See Sectional Catalogue.

Auto-Thermal Feed

ROYLE'S PATENT.



A NEW SYSTEM OF BOILER FEEDING.

The illustration shows the apparatus as fitted to a Lancashire Boiler.

For further information

Auto-Thermal Feed

ROYLE'S PATENT.

1. It is an appliance for boiler feeding whereby the discharge from Steam Traps and the like is returned to boiler, together with the necessary make-up feed at the highest temperature, with resulting economy of both fuel and feed water.
2. The mechanism is extremely simple and positive. There are no frictional wearing surfaces requiring constant oiling and repacking as in pumps.
3. Entirely automatic. Will collect and feed the water at any temperature from any point either above or below the boiler.
4. Considerably more economical of steam than any pump.
5. Lowness of first cost-upkeep practically nil.

DESCRIPTION.

A—Hot Condensation Returns from Steam Traps, etc.
B—Hot Boiler Feed Make-up from Feed Water Heater.
C—Collector into which all Hot Boiler Feed is received.
D—Connecting Pipe between Collector and Lifter, containing Stop Valve and Non-return Valve.
E—Lifter for elevating Feed Water into Feeder.
F—Steam Valve Chest for operating Lifter.
G—Non-return Valve through which Feed Water passes to Feeder **H**.
H—Feeder placed well above Boiler as shown.
J—Diaphragm and Valve for controlling Steam operating Feeder and regulated by pressure in Lifter **E**.
K—Non-return Valve between Feeder and Boiler.

Sizes made and prices.

Duty in galls. per hr.	250	500	1,000	2,000	3,000
PRICE...	**£50**	**£70**	**£90**	**£120**	**£165**
Code Word	Autoquar	Autodem	Autone	Autow	Autree

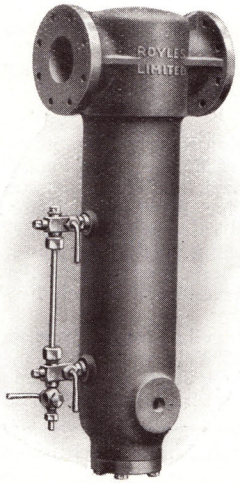
This price includes the two vessels forming the lower unit; the upper vessel with tee, pedestal, elbow and diaphragm valve, also the two check valves and special tee. But does **not** include the inter-connecting W I. pipes, stop valves, etc., nor for fixing.

See Sectional Catalogue.

Steam Dryers

For intercepting the water arising from condensation or priming in steam pipes. Ensures the passage of DRY STEAM only to Engines or other apparatus.

The price includes for steam trap "Syphonia Rapide Pattern" as illustrated and described on pages 56 to 59, but the water gauges shown on the illustration are extra.



When ordering state steam pressure and length of piping to be drained.

SUITABLE FOR ALL PRESSURES UP TO 200 lbs.

See Sectional Catalogue.

Steam Dryers.

Sizes made and Prices.

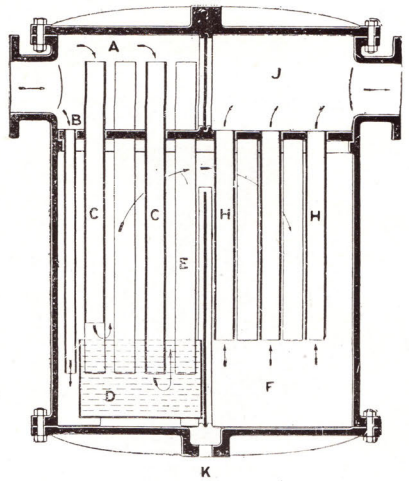
Bore of Steam Way	Diameter of Flanges	Length face to face of Flanges	Depth from centre of Pipe	PRICES including Steam Trap	Code Word	Extra for Water Gauge Cocks
Ins.	Ins.	Ins.	Ft. Ins.	£ s. d.		£ s. d.
1½	5½	8	1 4	6 0 0	Accord	
2	6½	10	2 0	7 10 0	Accessus	
2½	7¼	10	2 0	8 5 0	Acclaim	2 10 0
3	8	14½	2 5	10 10 0	Acero	
4	9	14½	2 9	12 0 0	Acetic	
5	11	19½	3 0	16 10 0	Achates	
6	12	19½	3 3	18 0 0	Acid	
7	13¼	24	3 9	24 0 0	Acier	
8	14½	24	3 9	25 10 0	Acme	3 10 0
9	16	27	4 3	28 10 0	Acqua	
10	17	27	4 3	34 10 0	Acquire	
12	19¼	32	4 9	40 10 0	Acoso	

Prices of larger sizes on application.

Oil Separator

Fletcher's Patent.

For extracting oil and grease from exhaust Steam. Fixed between the Engine and Condenser enables the water to be used with safety for Boiler Feed or other industrial purposes.



The steam is traversed over and through a large area of tube surface as is shown by the arrows. The oil and water of condensation deposits on the surfaces and runs down to the pocket **K,** whence it is discharged to atmosphere without loss of vacuum through a hollow revolving plug.

PRICES ON APPLICATION.

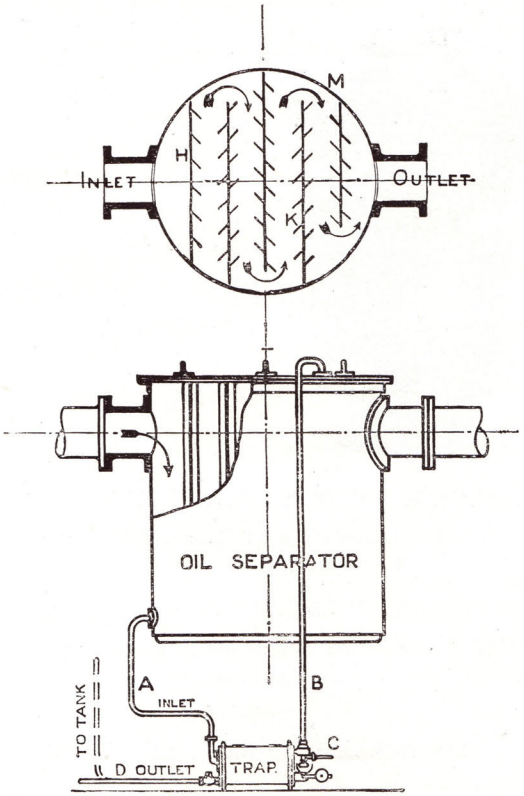
See Sectional Catalogue.

Oil Separator

Royle's Pattern 1912.

Fig. 2. A simpler form than Fig. 1, in which the oil arresting surface is composed of steel baffle plates, the steam following the course of the arrows.

The application of Royle's Patent Vacuum Trap is shown, for automatically removing the oil and water of condensation without impairing theivacuum.



PRICES QUOTED ON APPLICATION.

See Sectional Catalogue.

Exhaust Head

AND OIL CATCHER.

For fixing on the end of Exhaust Pipes of Steam Engines to prevent the water of condensation and oil carried by the steam being thrown down on to adjacent roofs and buildings and to reduce the noise of the Exhaust.

STRONGLY MADE WITH CAST-IRON ENDS.

And Galvanized Iron Case and Baffles

DRY STEAM ESCAPES FROM THE TOP.

The Condensation can be led to any convenient place for discharge.

NO INCREASE OF BACK PRESSURE.

See Sectional Catalogue.

Exhaust Head

AND

OIL CATCHER.

Sizes made and Prices.

Size of Exhaust	Diameter of Flange (undrilled)	Height	Dia.	Size of Drain	PRICE	Code Words
Ins.	in.	Ft. In.	Ft. In.	In.	£. s. d	
1½	1½ (Tapped Gas)	1 2	0 7	½	**3 0 0**	Darren
2	2 (,, ,,)	1 4	0 8	½	**3 15 0**	Dart
2½	7¼ in.	1 6	0 10½	¾	**4 17 6**	Dash
3	8 ,,	1 9	0 11¾	¾	**6 0 0**	Data
3½	8½ ,,	2 3	1 3½	¾	**6 7 6**	Datum
4	9 ,,	2 3	1 3½	¾	**7 10 0**	Davar
4½	10 ,,	2 9	1 7	1	**8 5 0**	Dave
5	11 ,,	2 9	1 7	1	**9 15 0**	Davico
6	12 ,,	3 2	1 11	1	**12 0 0**	Davina
7	13¼ ,,	3 6	2 2½	1	**13 10 0**	Davos
8	14½ ,,	4 0	2 6	1¼	**19 10 0**	Davy
9	16 ,,	4 5	2 10	1¼	**26 5 0**	Daw
10	17 ,,	4 9	3 2	1½	**30 0 0**	Dawn
11	18 ,,	5 2	3 6	1½	**45 0 0**	Dax
12	19¼ ,,	5 8	3 9	1½	**60 0 0**	Day
14	21¾ ,,	6 2	4 6	2	On Application	Dayfly
16	24 ,,	6 7	5 6	2		Dayson

LARGER SIZES MADE TO ORDER.

The above dimensions are approximate.

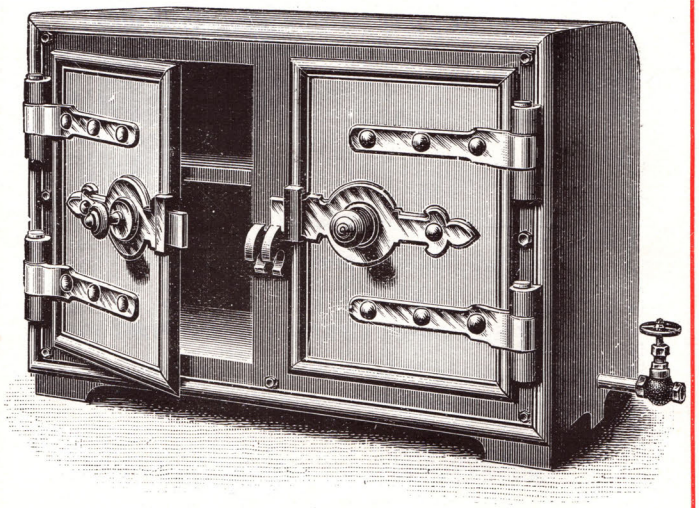
Steam Ovens

For warming workmen's meals by high-pressure steam.

Made with two doors, hinges and latches finished bright, strong cast-iron door frame and sides, top and back closed in with blue sheet steel. One open shelf. Tested to 300 lbs. pressure.

Capacity about 40 dinners.

A cheaper pattern is made with bottom plate only and rolling steel cover. Will hold about 20 dinners.



See Sectional Catalogue.

Steam Ovens

SIZES MADE AND PRICES.

OUTSIDE DIMENSIONS.

	PRICE £ s. d.	Code Word
Fig. I. As Illustrated. Dimensions—Length 3 feet, Depth 1 foot 10 in., Height 2 feet 1 in.	**20 0 0**	Meats
Fig. II. With bottom Hot Plate only, and rolling Steel Cover. Length 3 feet, Depth 1 foot 9 in., Height 1 foot 3 in.	**10 10 0**	Nevo
Fig. III. A larger size. Length 4 feet 10 in. Depth 2 feet 6 in., Height 3 feet 8 in., with three Shelves. Made with two doors, Latch and Hinges finished bright...	**56 0 0**	Larnevo

Glue Kettles

ROW'S PATENT.

Made in a variety of patterns and sizes. The Illustration shows a very convenient combination of Glue Pots and Hot Water Pan, and draw-off tap for charging Glue Pots.

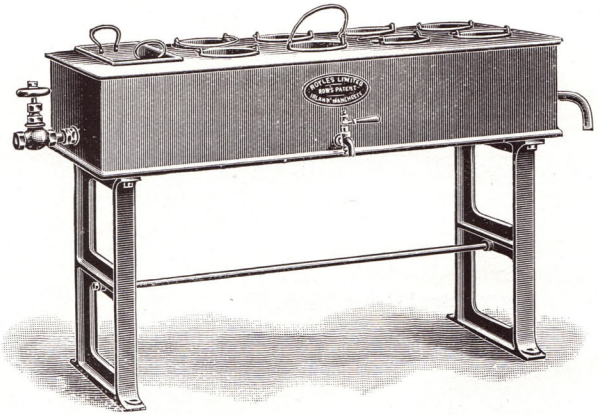


Fig. 1.

The boiling tube is Row's Patent, extending from the steam valve on the inlet to the bend on the outlet, and is very efficient and quick in action. The whole mounted on neat Cast-iron Stand.

See Sectional Catalogue.

Glue Kettles

Small Size with two pots.

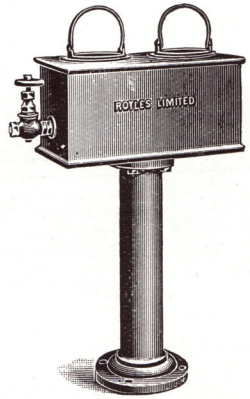


Fig. 2.

Sizes made and Prices.

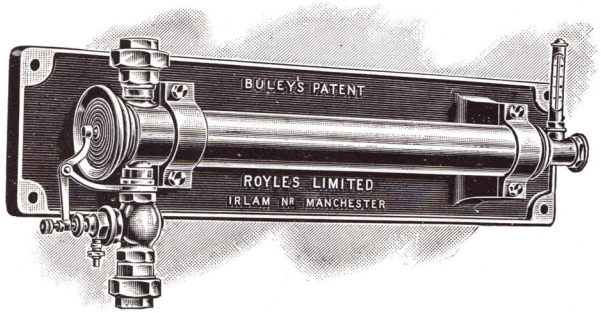
As Fig. 1, to hold 8 to 10 two-pint Glue Pots ...	£15	15	0
,, 2, ,, 2 two-pint Glue Pots	5	5	0
,, 2, ,, 2 two-quart Glue Pots	6	0	0
,, 2, ,, 3 two-quart Glue Pots	8	5	0

See Sectional Catalogue.

Bath Fittings

BATH WATER BLENDER
FOR
SPRAY BATHS.

Buley's Patent.



AUTOMATIC IN ACTION.

Designed primarily for use in Spray Baths when the temperature of the water requires to be controlled within certain prescribed limits with reliability and certainty, but is applicable to Bath supplies in general, and industrial operations where the object desired is a definite resultant temperature from a mixture of hot and cold water.

SUPPLIED TO SOME OF THE
LARGEST ASYLUMS IN THE COUNTRY.

PRICE – **£18 0 0**

See Special Catalogue.

Bath Fittings–Water Blenders

Fig. 5.—Douche Fitting for the perfect mixing and control of tepid waters to showers. It consists of a three-way cock operated by lever handle. A pointer sweeps over a dial in which is indicated "Cold," "Tepid." The internal ways of the fitting are so arranged that the cold water must come on first, followed by hot in a restricted proportion, so that the mixed water issues to shower at a tepid heat. The movement of the handle is limited by stops on the dial, so that it is out of the power of the bather to draw anything but cold or tepid water. To provide for the difference between summer and winter temperature of the cold supply, the dial is movable within a slight range under the control of the locking device seen under the handle.

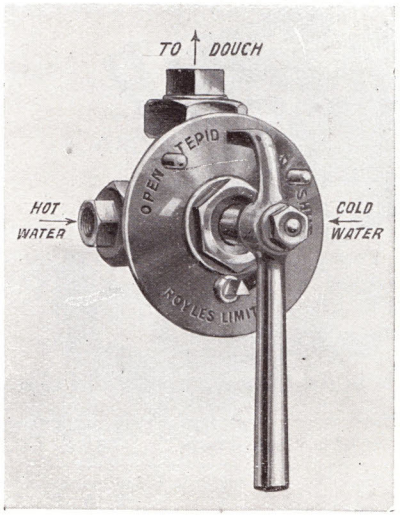


Fig. 5.

SIZES MADE AND PRICES.

No. of Blender	Size of Inlets	Size of Outlet	PRICE
	Ins.	Ins.	£ s. d.
1	$\frac{3}{8}$	$\frac{1}{2}$	**3 10 0**
2	$\frac{1}{2}$	$\frac{3}{4}$	**4 5 0**
3	$\frac{3}{4}$	1	**5 10 0**
4	1	$1\frac{1}{4}$	**7 0 0**
5	$1\frac{1}{4}$	$1\frac{1}{2}$	**9 0 0**

For particulars of other patterns see Sectional List.

Bath Fittings—Water Blenders

Platt's Patent Douche Fitting.

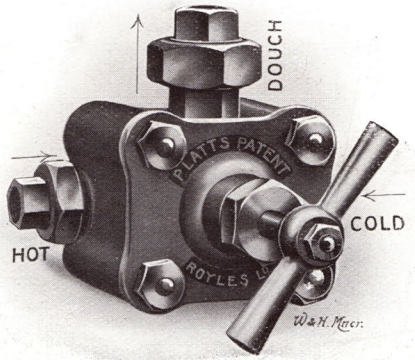


Fig. 9.

This Fitting is made in the following Sizes and Prices.

No. of Blender	Size of Inlets	Size of Outlet	PRICE
	Ins	Ins.	£ s. d.
1	$\frac{3}{8}$	$\frac{1}{2}$	5 0 0
2	$\frac{1}{2}$	$\frac{3}{4}$	6 0 0
3	$\frac{3}{4}$	1	7 10 0
4	1	$1\frac{1}{4}$	9 0 0
5	$1\frac{1}{4}$	$1\frac{1}{2}$	12 0 0

This Blender is also made (to order) for use with steam where hot water is not available. The Steam and water pressure should be fairly constant to give the proper resultant temperature.

For particulars of other patterns see Sectional List.

Saint's Patent Spray

FOR

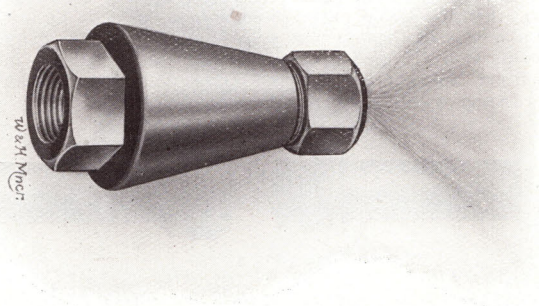
LAYING COAL DUST in MINES,

HUMIDIFYING, DAMPING,

COOLING WATER for CONDENSING PURPOSES,

MOISTENING AIR SCREENS,

ETC., ETC.



An efficient strainer or filter is fitted inside the body to prevent the nozzle being fouled with dirt.

This sprayer will be found very useful wherever a fine mist-like spray is a necessity.

PRICE:—Made in Gun-Metal, tapped $\frac{1}{2}$ in. gas as illustrated, **9**/- each.

Patent Flange Coupling

Royle's Patent.

For Connecting Light Copper Pipes.

DESCRIPTION.

This coupling is designed for readily connecting together copper or brass tubes of light gauge without the necessity of screwing. The economy in the cost of light over heavy copper or brass piping of screwing strength is obvious, and by means of this union it is perfectly practicable to use these light pipes, where hitherto screw-strength has been considered a necessity.

The connection is made by raising a flange on the ends of the pipes to be connected, and they are brought firmly together by means of a union or coupling, which draws together the two flanges, so forming a perfectly tight joint. By means of the machine illustrated (Fig. 3), this flange is so perfectly formed that the joint is made metal to metal without any packing between, and is perfectly tight for all pressures within the limits of the pipe.

Fig. 1.

Fig. 1 shews the coupling run back on the pipes preparatory to screwing together. The flanges are shewn formed on the pipe ends.

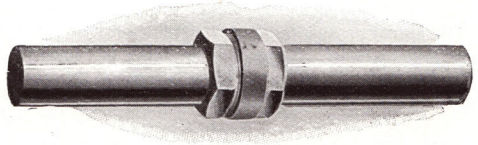


Fig. 2.

Patent Flange Coupling

(Continued)

Fig. 2. is the same joint screwed together. It is neat in appearance and thoroughly efficient.

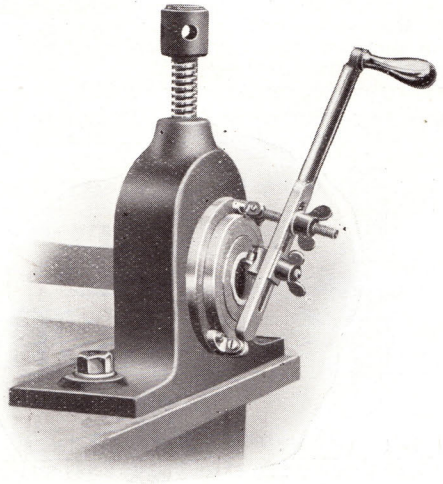


Fig. 3.

Fig. 3. illustrates the machine for forming the flange on the pipe. It consists essentially of a holding device very similar to a pipe vice bolted on to a bench. The pipe to be flanged is passed through a split bush and projected sufficiently through to form the flange. The bush is now secured by the screw and the flange is thrown over by a steel roller running in bearings in a bush on the handle bar. The handle bar itself is hinged to a rim which revolves behind a fixed collar in the machine frame, and by revolving the roller against the pipe end, at the same time tightening the wing nut, the flange is perfectly formed.

See Sectional Catalogue.

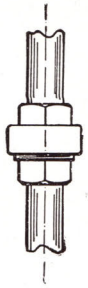
Flange Couplings for Light Pipes

(Continued.)

Made in Gun-Metal in various patterns, ½ in. to 3 in., as illustrated. Other patterns made to order.

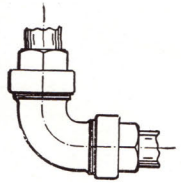
N.B.—The fittings are designed for pipes measured outside as being the most general practice. They can be adapted to inside measure to order. When ordering state the outside diameter of the pipe and the gauge.

Pattern A.—Straight Coupler.



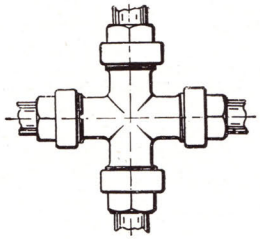
½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
2/3	2/3	2/9	3/9	5/3	6/9	9/9	19/6	22/6

Pattern B.—Elbow.



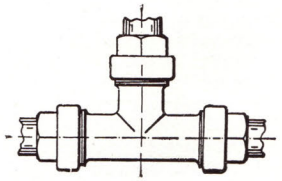
½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
5/3	5/3	6/-	8/3	11/3	15/-	22/6	45/-	56/6

Pattern C.—Cross.



½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
8/3	8/3	9/-	14/3	18/9	27/-	37/6	75/-	97/6

Pattern D.—Tee.

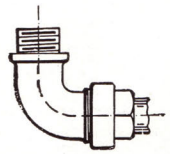


½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
6/9	6/9	7/6	11/3	15/-	21/-	30/-	60/-	75/-

Pattern E.—Coupler with one end screwed male or female.

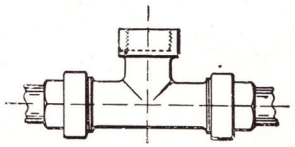
½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
3/-	3/-	3/9	4/6	6/6	8/9	12/-	24/-	30/-

Pattern F.—Elbow with one end screwed male or female.



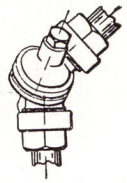
½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
4/6	4/6	5/3	6/9	8/3	11/3	15/-	30/-	45/-

Pattern G.—Tee with one end screwed male or female.



½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
5/3	5/3	6/-	8/3	12/-	17/3	24/-	54/-	67/6

Pattern H.—Patent Joint applied to Swivel Union



For description of this Union see page 106.

½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"
–	–	9/-	12/-	17/3	23/3	37/6	75/-	102/-

Price of Patent Machine for forming the Flanges complete with bushes for tubes up to and including 2 in. ... ... £11 10s.

For 2½in., 3in. and 4in. tubes a larger machine is made, £15 15s.

Hire of either Machine, 6/- per week.

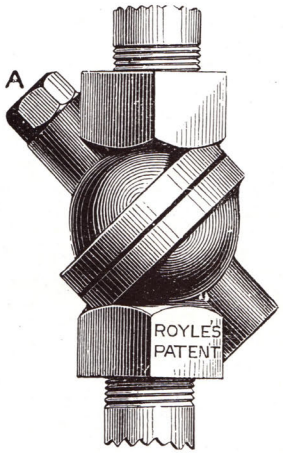
The following Gauges of Copper Pipes are suggested as being suitable for Hot Water Installations :

⅝in. outside dia. × 20 W.G.
¾in. „ „ × 20 W.G.

1 in. outside dia. × 18 or 20 W.G.
1¼in. „ „ × 18 or 20 W.G.
1½in. outside dia. × 18 or 20 W.G.
2 in. „ „ × 16 or 18 W.G.

Swivel Unions

Royle's Patent.



A Union and universal joint or bend in one article.

The joint of the Union is made at an angle of 45° with the axis of the Union, and by swivelling the two portions on each other, any angle can be obtained from a straight line to a right angle.

The joint is a double cone ground together. No jointing material is required.

The holding together is accomplished by a steel set-screw **A** passing through the body of the Union.

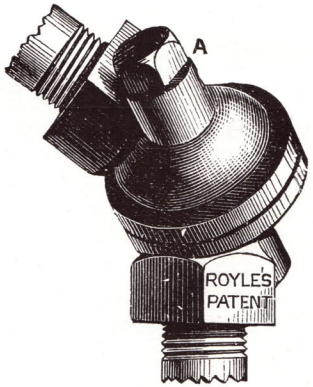
A UNION and BEND IN ONE ARTICLE.

SAVES BENDING PIPES.

Made in 12 Sizes.

IN GUN-METAL for WROUGHT-IRON PIPES, and in

CAST-IRON for FLANGED PIPES.



See Sectional Catalogue.

Swivel Unions

Sizes made and Prices.

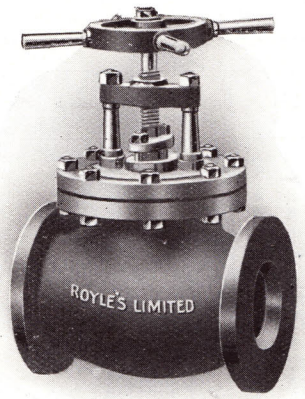
To suit Gas Thread	All Brass	Iron	Code Word In Brass	Code Word In Iron
Ins.	£ s. d.	£ s. d.		
$\frac{1}{4}$	2 9	2 9	Cabinet	Cabir
$\frac{3}{8}$	3 6	3 6	Cabrito	Cabrir
$\frac{1}{2}$	4 6	4 6	Cachous	Cachir
$\frac{3}{4}$	6 0	5 9	Cadarn	Cadair
1	8 3	7 6	Cadell	Cadelir
$1\frac{1}{4}$	11 3	9 9	Cadres	Cadresir
$1\frac{1}{2}$	15 0	13 6	Calash	Calasir
$1\frac{3}{4}$	1 1 0	19 6	Calemar	Calemir
2	1 5 6	1 4 0	Caledon	Caledir
$2\frac{1}{2}$	2 5 0	1 17 6	Calef	Calefir
3	3 15 0	3 0 0	Calega	Calegir
4	6 0 0	3 15 0	Calegrabs	Calegrair

Swivel Bends

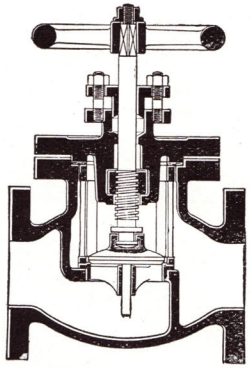
For Flanged Cast-Iron Pipes.

Size	Diameter of Flanges	Length over all	PRICE	Code Word
Ins.	Ins.	Ins.	£ s. d.	
2	$6\frac{1}{2}$	10	15 9	Callian
3	8	12	1 2 6	Calnan
4	9	13	1 10 0	Caloric
5	11	$16\frac{3}{8}$	2 12 6	Camp
6	12	$18\frac{1}{4}$	3 7 6	Camphor
7	$13\frac{1}{4}$	On Application.		Canal
8	$14\frac{1}{2}$			Canis

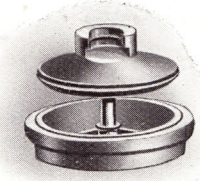
Iron Steam Valves



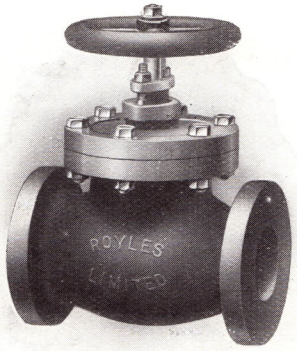
No. 2899—Outside Screw.



Section of No. 2362.



Renewable Valve and Seat.



No. 2362—Inside Screw.

For other patterns, see Sectional Catalogue.

Iron Steam Valves

WITH RENEWABLE GUN-METAL VALVES and SEATS.

Special prices quoted for Steel Bodies and Covers for High-Pressures.

SIZES MADE AND PRICES.

No. 2362.—INSIDE SCREW.

Size	2 in.	2½ in.	3 in.	3½ in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
Dia. of Flanges ...	6½ in.	7¼ in.	8 in.	8½ in.	9 in.	11 in.	12 in.	13¾ in.	14¾ in.	16 in.	17 in.	19¼ in.
Leng. over Flanges	8¾ in.	9¾ in.	11 in.	12 in.	13½ in.	15⅞ in.	18 in.	21 in.	23½ in.	26¼ in.	—	—
Price	78/–	92/–	118/–	131/–	147/–	210/–	245/–	323/–	367/–	437/–	525/–	840/–
Spare Valve & Seat	14/–	17/6	22/–	24/6	26/3	30/6	43/9	61/3	87/6	113/9	140/–	184/–

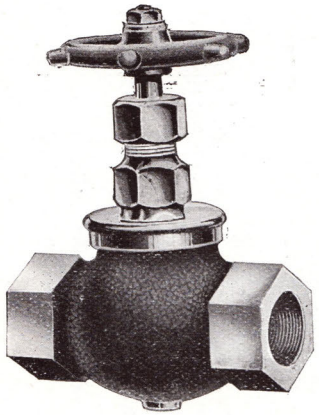
No. 2899.—OUTSIDE SCREW.

Size	2 in.	2½ in.	3 in.	3½ in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
Dia. of Flanges ...	6½ in.	7¼ in.	8 in.	8½ in.	9 in.	11 in.	12 in.	13¾ in.	14½ in.	16 in.	17 in.	19¼ in.
Leng. over Flanges	8¾ in.	9¾ in.	11 in.	12 in.	13½ in.	15⅞ in.	18 in.	21 in.	23½ in.	26¼ in.	—	—
Price	96/–	113/–	140/–	161/–	192/–	245/–	280/–	385/–	472/–	647/–	735/–	1137/–
Spare Valve & Seat	14/–	17/6	22/–	24/6	26/3	30/6	43/9	61/3	87/6	113/9	140/–	184/–

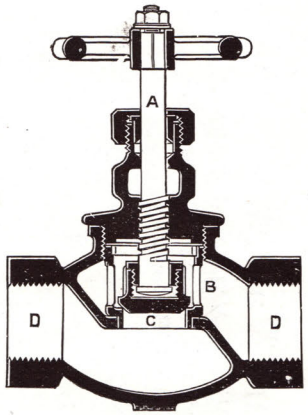
See Sectional Catalogue for particulars of other patterns.

Royle's "FERIKEL" Valve for High-Pressure Superheat.

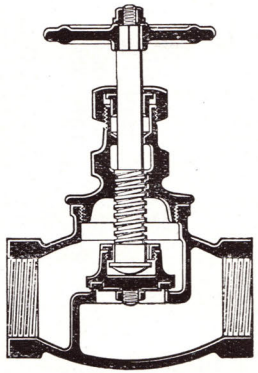
Gun-Metal Steam & Water Valves



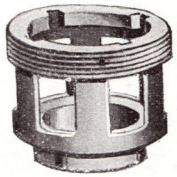
Outside View—Nos. 2364 and 1904.

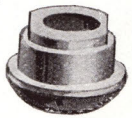


Section of No. 2364.



Section of No. 1904.





Renewable Valve and Seat for No. 2364.

For other patterns,

IRLAM, near MANCHESTER.

Gun-Metal Steam and Water Valves

SIZES MADE AND PRICES.

PATTERN No. 2364—RENEWABLE VALVE and SEAT.

Size of Valve	⅜ in.	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	3 in.
All G.M. screwed ends	11/6	12/3	15/9	20/–	27/–	36/9	63/–	122/6	153/–
,, flanged ends	—	—	24/6	32/6	44/6	53/6	92/9	150/6	183/9
Extra for Nickel Alloy V. and S. ...	2/3	2/3	2/9	3/6	4/6	6/3	8/–	17/6	22/–
Spare Valve and Seat G.M. ...	2/3	2/3	2/9	3/6	4/6	6/3	8/–	17/6	22/–
,, ,, Nickel Alloy ...	4/6	4/6	5/6	7/–	9/–	12/6	16/–	35/–	44/–
Extra for similar G.M. Valve but with **outside** screw, screwed or flanged	—	5/6	6/3	6/3	8/–	9/–	10/6	22/–	26/3

PATTERN No. 1904.—RENEWABLE DISC.

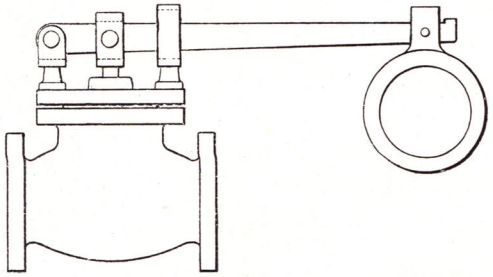
Size of Valve	⅜ in.	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	3 in.
Screwed ends		9/6	11/6	15/9	26/3	35/–	52/6	108/–	132/–
Flanged ends		13/–	15/9	21/–	33/–	45/6	67/6	125/–	157/6
Renewable Disc—copper		3½d.	3½d.	7d.	9d.	1/2	2/3	4/–	6/3
,, ,, —fibre		2½d.	2½d.	4½d.	5½d.	8d.	1/4	2/2	2/8

See Sectional Catalogue.

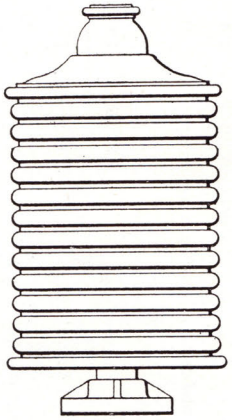
IRLAM, near MANCHESTER.

Safety & Relief Valves

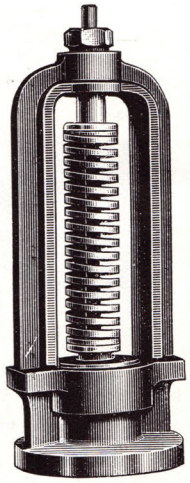
CAST-IRON.



Patt. WB.



Patt. OOX.

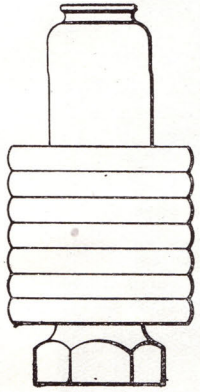


Patt. XXX.

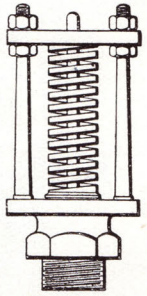
For other Patterns and Prices,

Safety & Relief Valves

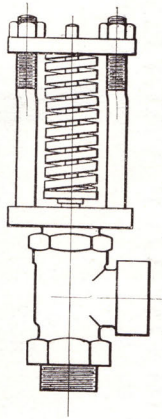
GUN-METAL.



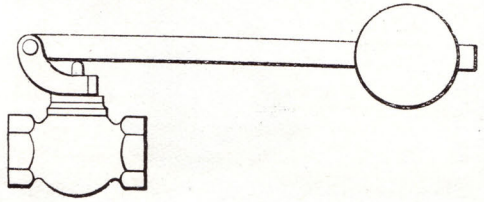
Patt. V.



Patt. X.



Patt. XN.



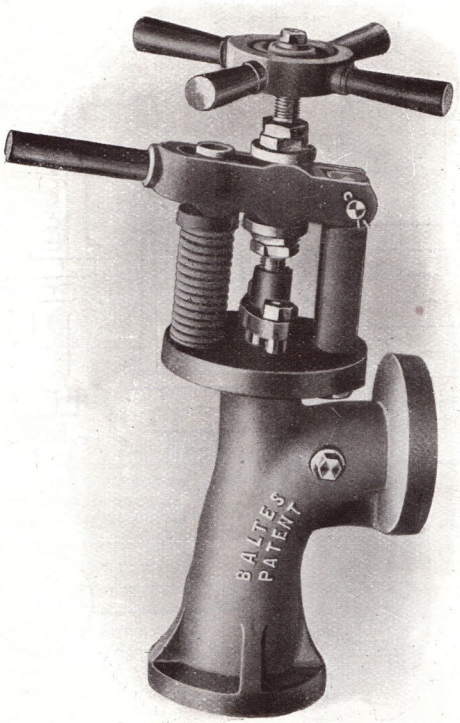
Patt. W.

See Sectional Catalogue.

BOILER BLOW-OFF VALVE.

GROUND IN UNDER PRESSURE.

CANNOT BE LEFT OPEN.



See Sectional Catalogue.

Boiler Blow-off Valve

A valve possessing many advantages and the result of long experience.

Fig. 2. shows the valve as fitted to a Lancashire-type boiler. The operating handle **D** passes through a slot in the chequer-plate. **H** is a tell-tale pipe to give warning of any leak by vapour issuing from its open end. The valve is ground in by rotating the hand-wheel at the back.

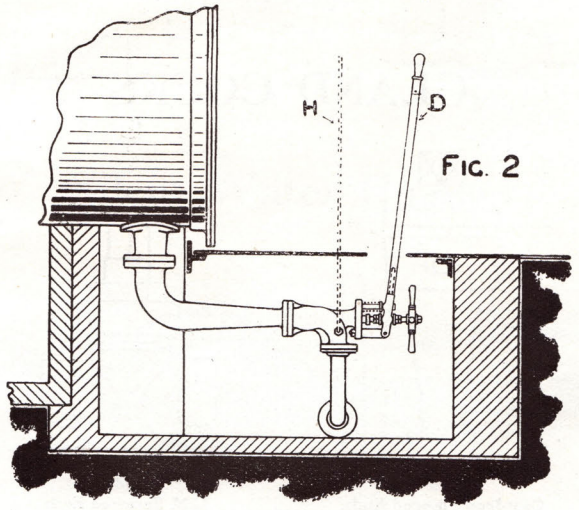
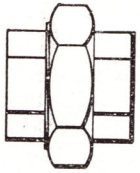


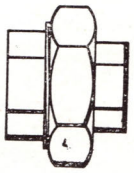
FIG. 2

SIZES AND PRICES ON APPLICATION.

High-class Gun-Metal Unions



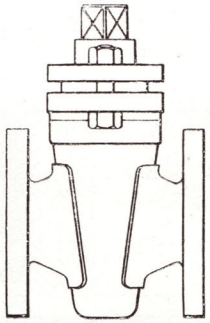
62
Even Ends.



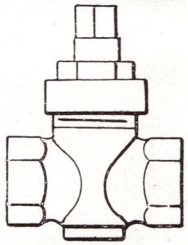
62a
Odd Ends.

All sizes from ¼ in. to 3 in.

GLAND COCKS



509
Cast-Iron Flanged Ends.



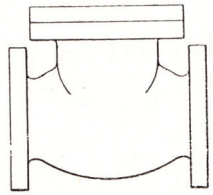
64
G.M. Screwed Ends.

Also made in **Nickel-Iron** and as Three-way Cocks.

For other Patterns and Prices,

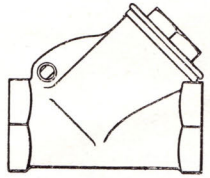
Back-Pressure Valves

Cast-Iron
Flanged Ends.



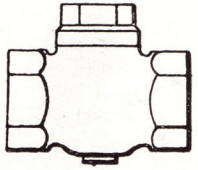
561

Patterns to suit all requirements.



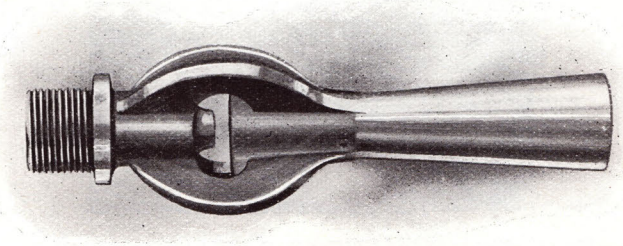
533

Gun-Metal
Screwed
Ends.



63

Silent Water Heaters



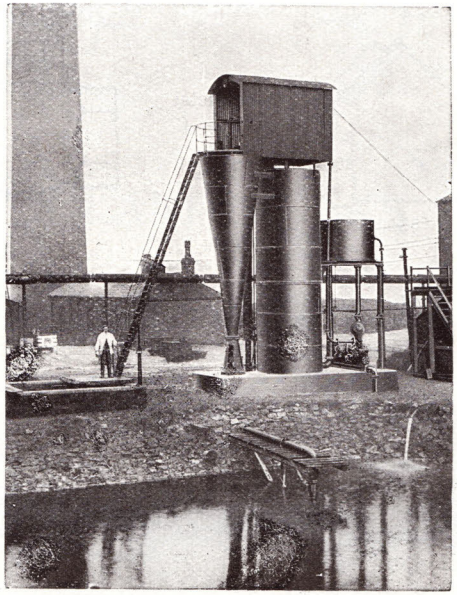
554

Made in G.M. throughout. All sizes from ½ in. to 2 in.

See Sectional Catalogue.

WATER SOFTENING
AND
PURIFICATION

For Boiler Feed or Manufacturing Purposes



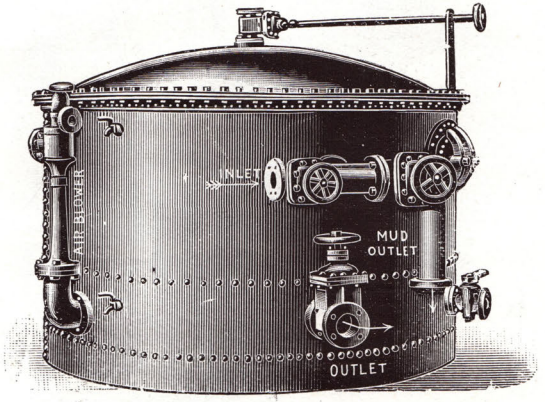
Fitted with AUTOMATIC SELF-CLEANSING FILTER

SIZES and PRICES TO

IRLAM, near MANCHESTER.

Water Filtration
FOR ALL
Industrial Purposes

The illustration shows the pressure type.



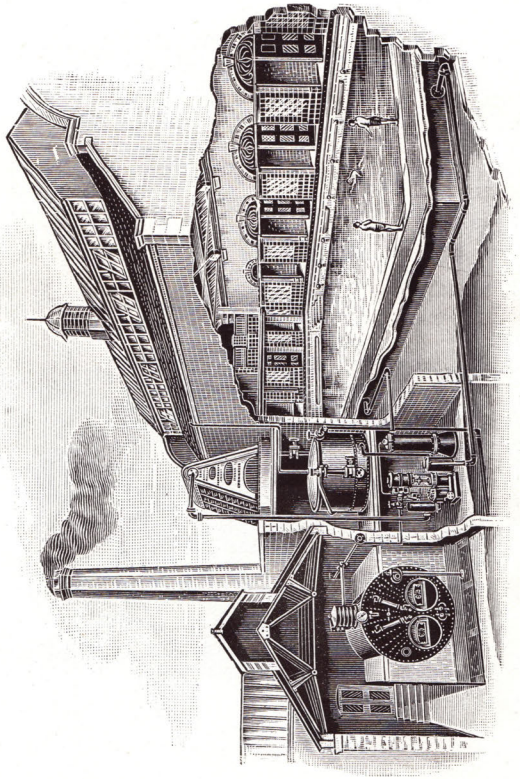
Can also be supplied

with the AUTOMATIC SELF-CLEANSING DEVICE.

INDIVIDUAL REQUIREMENTS.

IRLAM, near MANCHESTER.

Purification of Bath Water—ROW'S PATENT SYSTEM.



For maintaining the purity of the Plunge-Bath Water over a very prolonged period, thus effecting a distinct saving in water and steam and improving bathing conditions.

Over 130 SETS AT WORK.

FOUNDRY DEPT.

IRON ═══ BRASS

IRON CASTINGS

IN GREEN, DRYSAND OR LOAM UP TO 7 TONS

ENGINE and HYDRAULIC CYLINDERS

"FERIKEL" MIXTURE

for SUPERHEATED STEAM

BRASS CASTINGS

IN GUN-METAL, PHOSPHOR-BRONZE AND ADMIRALTY MIXINGS

SPECIAL NICKEL-BRONZE MIXINGS for SUPERHEATED STEAM

ENQUIRIES SOLICITED.

Index

A

	Pages
Air Heaters	40, 41
Automatic Boiler Feeder	85
Auto-Thermal Feed	88, 89

B

Back-Pressure Valves	119
Bath Fittings	100-102
Bath Water Purification	122
Batteries, Boiling	38, 39
Blenders, Water	100-102
Blow-off Valves	116, 117
Boiler Feeder, Automatic	85
Boiling Nozzles	119
Brass Castings	123

C

Calorifiers, Figs. 1 and 2	8-11
Calorifiers, Storage	12, 13
Castings, Iron and Brass	123
Check Valves	119
Condensers	24, 25
Conditions of Business	4
Coolers, Oil	42
Couplings, Flange	104-107

E

Evaporators	20-23
Exhaust Heads	94, 95

INDEX.—*Continued.*

F

Feed-Water Heaters, Class A	14, 15
Feed-Water Heaters, Class B	16, 17
Feed-Water Heaters, Live Steam	18, 19
Filtration Plant	121
Flange Couplings	104-107

G

Gas Kettles	32-35
Glue Kettles	98, 99
Gun-Metal Valves	112, 113

H

Heaters, Air	40, 41
Heaters, Feed-Water	14-19
Heaters, Instantaneous	26, 27
Heaters, Inter- and Re-	43
Heaters, Oil	42
Heaters, Water (See Calorifiers)	8-13
Heaters, Water by Water	44
Heaters, Silent Water	119

I

Instantaneous Water Heater	26, 27
Inter-Heater	43
Iron Castings	123
Iron Valves	110, 111

K

Kettles, Gas	32-35
Kettes, Glue	98, 99
Kettles, Steam	28-31

L

Lubricators, Sight-Feed	86, 87

INDEX.—*Continued.*

O

Oil Heaters and Coolers 42
Oil Separators 92, 93
Ovens, Steam 96, 97
Oil Strainers (Twin) 76, 77

P

Pumps, Steam 80-84

R

Radiators 36, 37
Reducing Valves 63-71
Re-Heaters 43
Relief Valves 114, 115
"Row Tube" 6, 7

S

Safety Valves 114, 115
Saint's Spray 103
Separators, Oil 92, 93
Separators, Water 90, 91
Sight-Feed Lubricators 86, 87
Silencers, Exhaust 94, 95
Silent Water Heater 119
Softeners, Water 120
Steam Dryers 90, 91
Steam Kettles 28-31
Steam Ovens 96, 97
Steam Pumps 80-84
Steam Traps ("Syphonia" and others) 46-59
Steam Valves 110-115
Storage Calorifiers 12, 13
Strainers, Single 78, 79
Strainers, Twin... 72-77
Super-Lifting Trap 60, 61
Surplus Valves 62
Swivel Unions 108, 109

INDEX.—*Continued.*

T

Traps, Steam 46-59
Traps, Vacuum and Super-Lifting 60, 61
Twin Strainers 72-77

U

Unions, Ordinary 118
Unions, Swivel 108, 109

V

Vacuum Traps 60, 61
Valves, Back-Pressure... 119
Valves, Blow-Off 116, 117
Valves, Gun-Metal 112, 113
Valves, Iron 110, 111
Valves, Reducing 63-71
Valves, Safety and Relief 114, 115
Valves, Surplus 62

W

Water Blenders... 100-102
Water Filtration 121
Water Heating (See Heaters) ... ...
Water Purification, Baths 122
Water Softening and Purification 120